CIO

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SPECIAL ISSUE

Can IT Help Restore Faith In Public Service?

CIOs Raise The Standard For Government IT

Philadelphia's John Carrow

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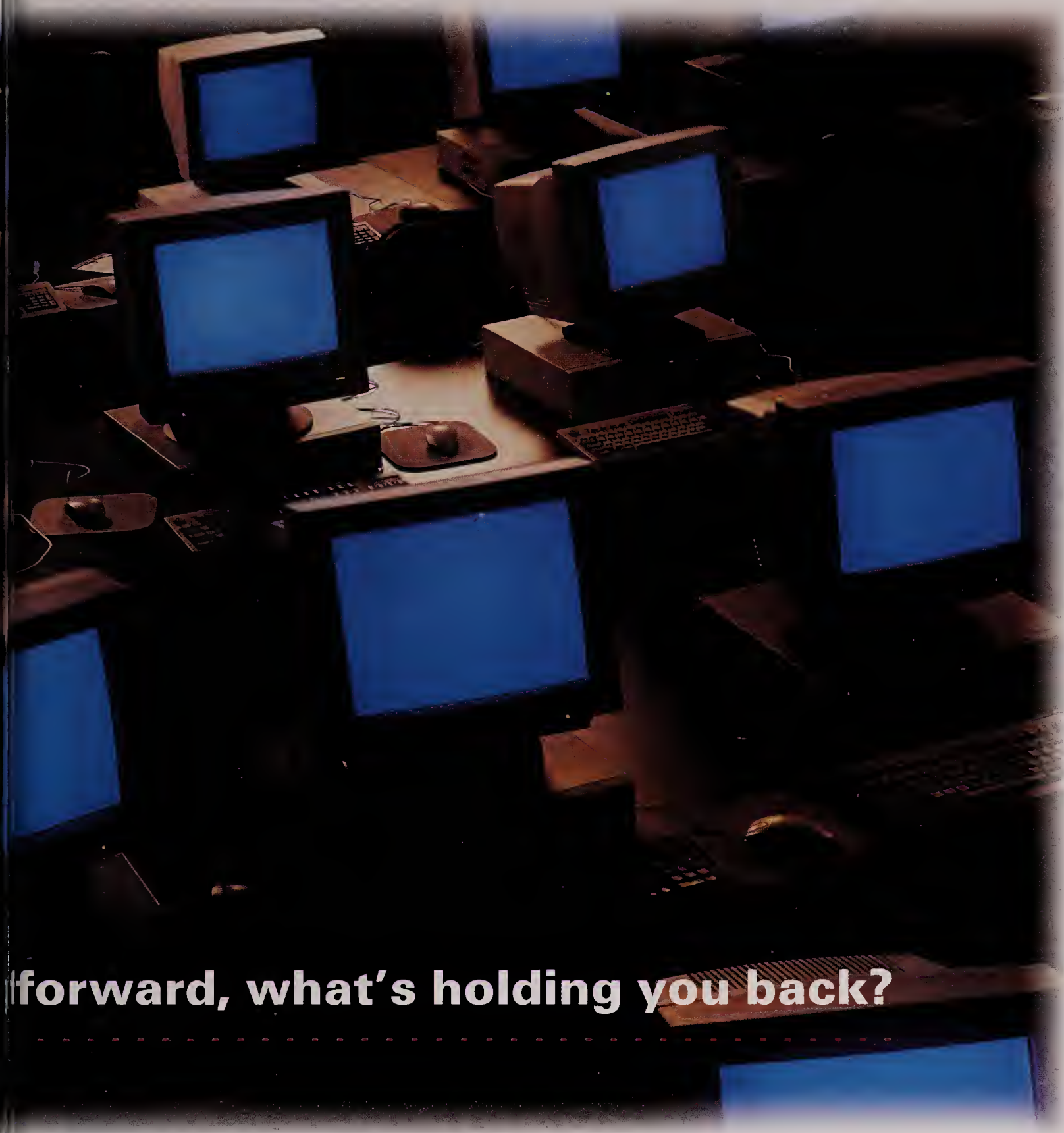

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SPECIAL ISSUE: I.T. IN GOVERNMENT

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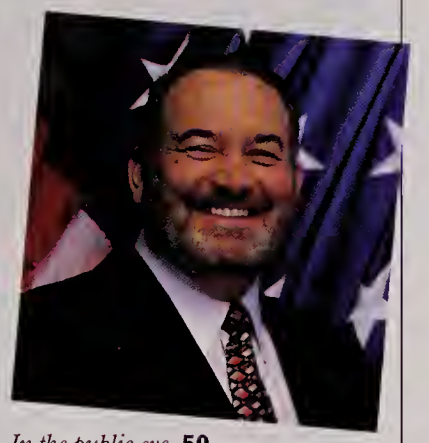
Public-Address Systems

Awakened by calls for governmental reform, public sector information systems are beginning to tackle inbred inefficiencies and advance the centuries-old quest to form a more perfect union. *By Peter Fabris*



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Cover photo by Ed Wheeler

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As the public sector's "devolution revolution" gets underway, U.S. government—at every level—will focus on how IT can help make it run better and cost less. *By Mickey Williamson*

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IS G-men

Public sector CIOs play an important role in the transformation of federal, state and local government. *By Peter Fabris*

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Despite the government's reputation for retrograde IT, these federal agencies have a thing or two to teach their corporate counterparts. *By Megan Santosus*

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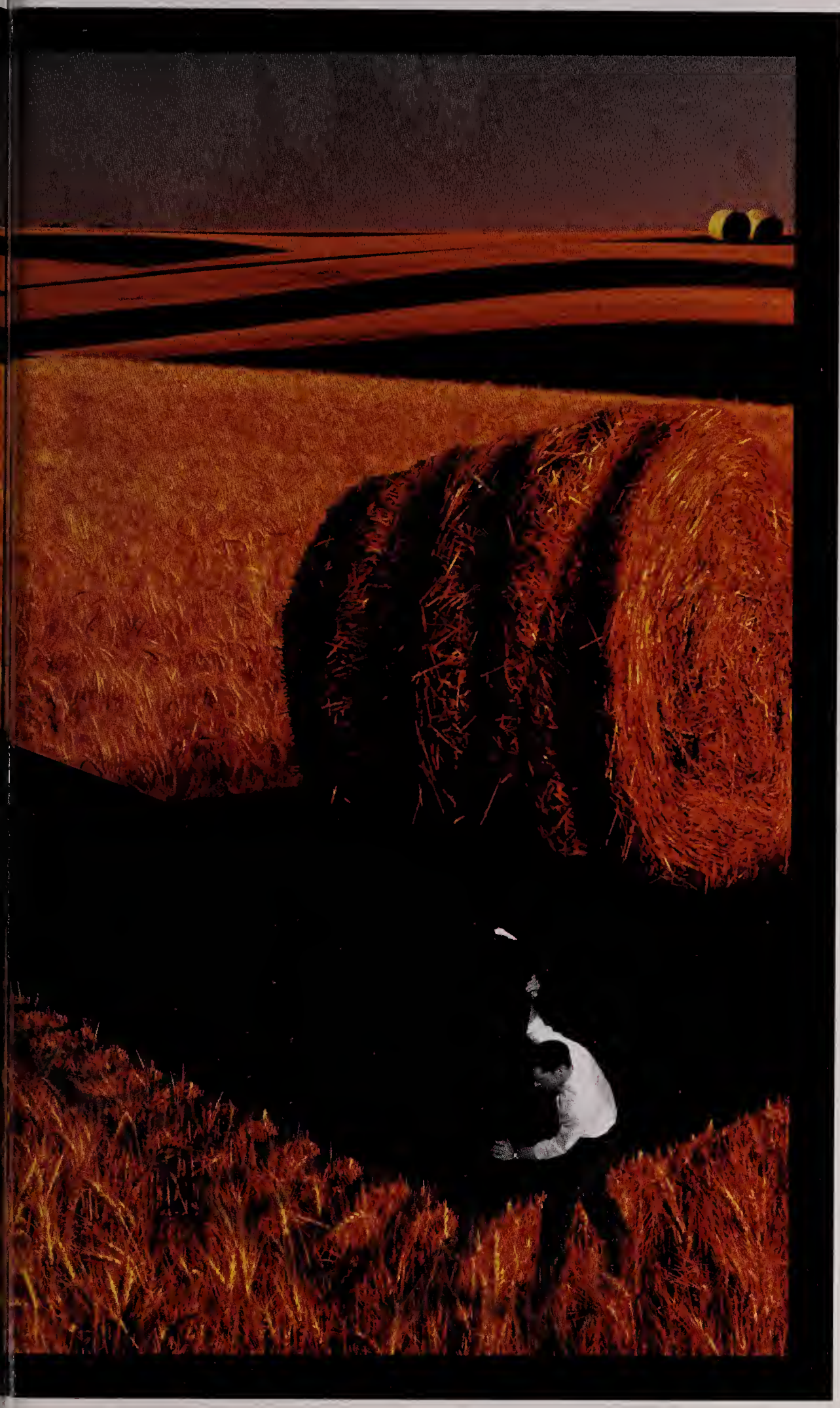

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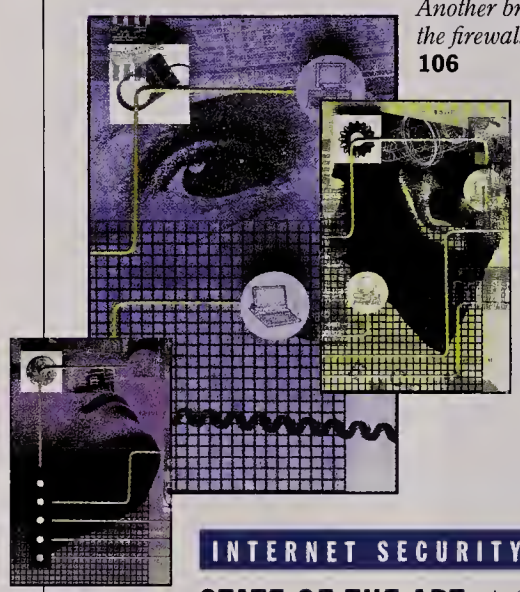

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CIOs in public service may ensure that IT will be the cutting edge and not the cutting wedge of social progress.
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New software and hardware can help protect your business, but the technology is only as good as the plan it supports.
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Big Open Systems That Work

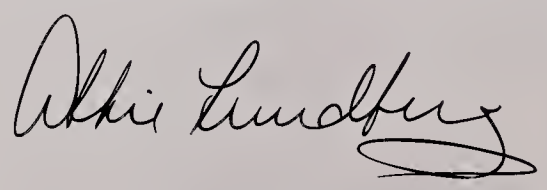
For CIOs in the public sector, the hard numbers are getting harder. The Cohen Act, which takes effect in August, specifies that each federal agency must reduce IT spending by 5 percent a year for the next five years. Federal CIOs must now make a strong business case for all IT spending. "The act requires CIOs to get measurable [business] results," says Joe M. Thompson, CIO of the General Services Administration, in Peter Fabris's article "IS G-men," Page 50. Yet so far there are no specific guidelines for measuring those results.

Last week I met one government IT executive who demonstrated the necessity not only of measuring but of finding a compelling way to assemble and communicate that information. The executive—a civilian working with one of the branches of the military—visited *CIO* to describe a method he had developed to evaluate his service's systems. What struck me was not the elegance or precision or uniqueness of his methodology. (It seemed a fairly standard though certainly very detailed approach.) But two things stood out. One was the focus on "business value," something we at *CIO* are always seeking to define. The other was the end game for the whole exercise—convincing top management of the value of specific systems in terms that even my 5-year-old could understand.

He had built a four-grid graphical tool to display value on two axes. The horizontal axis measured system performance; the vertical tracked business value. So systems that fell into the lower-right quadrant, for instance, were technologically superior but didn't answer the organization's or users' needs; systems that fell into the top left served users well but didn't offer the best performance, etc. The basic output of this tool is the ability to communicate with management in terms as basic as "good system, not-so-good system, bad system."

His point was not that senior management is ignorant or unable to grasp the minutiae; his strategy was that CIOs need a wedge, an opener, some very basic and fundamental starting point. The grid is simplistic, but its purpose is not to inform as much as to engage. More than any deluge of detail could, it provided a simple framework to spark a discussion.

Of course, a tool like this works only if there is trust between the two parties. If your boss doesn't walk in with the assumption that you really understand what value is in your particular organization, that you've got real data to back up your analysis and that you're diligent in exploring all the variables, you could be laughed right out the door.



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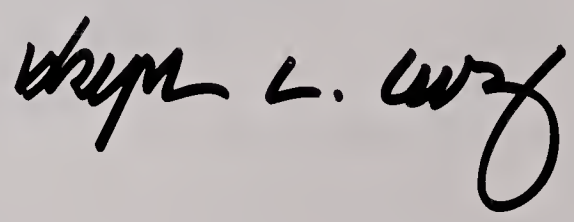
–Steve Kolodney
Director of the Department of Information Services for the state of Washington

If you've ever had the yen to work in the public sector but couldn't find a CIO position, now's the time to polish up your resume.

On Aug. 8, the federal government will finally experience what the private sector has been doing for years—using the brainpower of the CIO. The Cohen Act mandates that every major federal agency appoint a CIO in an effort to better manage information resources throughout government. But there is also a trickle-down effect. Federal subagencies as well as state and city governments are also looking tosenior-level IT strategists to reduce bureaucratic red tape.

This special issue coincides with the passage of such pivotal legislation. It is full of stories from federal, state and city government agencies that have broken new ground (and a few rules) to procure information systems that have led to better efficiency and productivity. A roundtable discussion with government experts (see "Rethinking the Way Government Works," Page 36) explores the potential benefits of the Cohen Act as well as examples of governments that are pushing the envelope. One such city is Phoenix (see "Phoenix Rising," Page 88), which has won numerous awards for its efforts in information management. You'll find in this story a city after which to model your own efforts, whether you are in the public or private sector.

So if you're looking to take on a new challenge, I have a feeling more CIO positions will be opening up shortly. As one consultant says in this issue, "Government CIO jobs could be the most exciting positions in the IT community today."



P.S. Internet security strategy is just one of many critical topics to be addressed at the first annual WebMaster Perspectives Conference, to be held Aug. 11-14 at the Westin St. Francis Hotel in San Francisco. For more information, visit our Executive Programs Web pages at *www.cio.com/conferences/proghome.html* or call our Executive Programs team at 800 355-0246. We encourage you to learn more about the many upcoming CIO Executive Programs by bookmarking this site and visiting us on the Web at your convenience.

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Coming In CIO

SPECIAL ISSUE: CIO-100

In our ninth annual CIO-100, we will honor 100 organizations that have established themselves as leaders in the global marketplace. The entire issue will be devoted to exploring the business and IT practices that have given these world leaders a competitive edge. *CIO* will examine how these organizations have become successful at building global management teams, managing across borders and cultures, and balancing local and worldwide demands. Our special issue will also include profiles of various U.S.- and foreign-based CIO-100 winners in a variety of industries that include manufacturing, services and finance.

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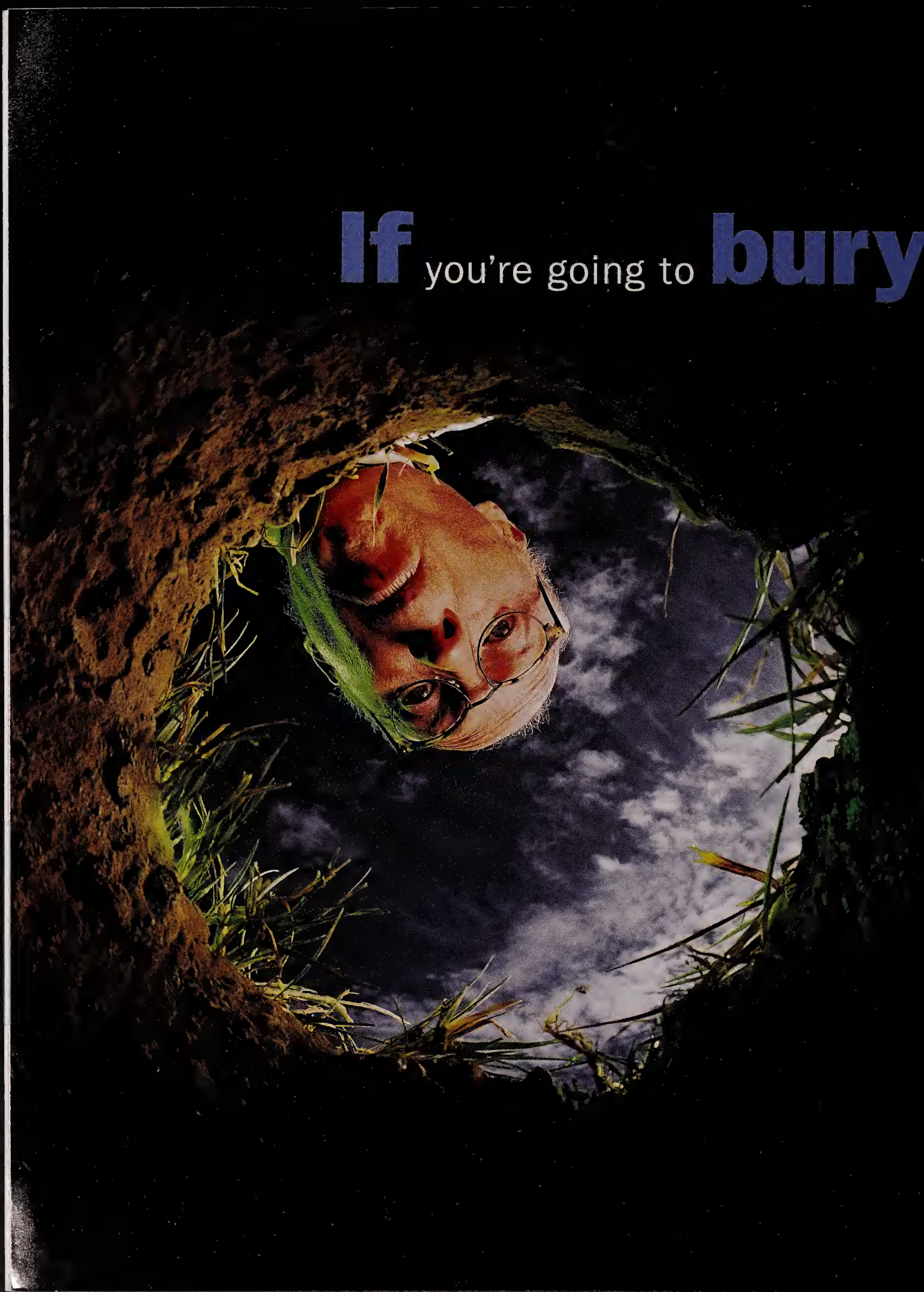
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only as good as its source."

Though the Web is a tremendous source of information, the electronic nature of the medium may actually widen—not bridge—the distance between candidates and voters, according to Jim Splaine, a state representative in New Hampshire and co-author of the book *Politics: Communicating a Message* (The Warwick Press, 1986).

"I worry about depersonalization," Splaine says. "If you have that, then you look at politicians differently than if you actually meet them, talk with them." Splaine, who favors door-to-door campaigning (in '92 he even took his opponent door to door with him to answer voters' questions) has seen both national and local political candidates establish Web sites, but so far he has resisted. "I've had a personal computer for years, but I've never taken that next step and gone online, and I don't feel deprived," Splaine says. "Then again, two years ago I didn't think I needed a fax machine either."

–Tom Field

Rural URLs

At Barren County Middle School in Glasgow, Ky., a group of seventh- and eighth-grade students has started a "cyberpublishing" company that designs Web pages for local businesses. Their enterprise sparked competition at Glasgow High School, where a similar group also develops Web pages.

What's the inspiration for these young netrepreneurs? A local network service, called HomeLAN, provided by the Glasgow Electric Plant Board (EPB). HomeLAN links about 700 workstations citywide, serving 200 homes, 50 businesses and a variety of city offices in the 13,000-person community. Glasgow originally installed its broadband network in 1989 for cable TV service but soon expanded it to telephones and a community intranet. Last year, with help from MCI, Glasgow acquired a T1 line and a router to hook the city into the Internet. About 250 people are listed in the city's e-mail directory, and several new homes sign up every day, says Bill Ray, superintendent at EPB.

Having direct connections has given citizens of Glasgow a bit of a distorted view of HomeLAN's significance in the Net world, Ray says. "To them, the Internet is something we came up with."

The city organizes about three tour groups a month to show other cities, counties and organizations how Glasgow's network operates. To date, more than 400 groups have expressed interest in the city's vision of the future of community and communication. "We think this is where it is all heading," Ray says. "The Internet will be the lowest common denominator."

WIRED CITIES

Power to the People

The city of the future might not be the much-predicted glitzy metropolis with rail cars and space needles nor the cyberpunk dystopia of mohawked mongrels with cranial media feeds. Instead, it might be a land of corn rows and fishing holes, where barn raisings take place only after the fiber-optic cable is laid.

Less-than-cosmopolitan towns that once had trouble getting cable TV service have started to outdo their urban siblings on the IT curve. Chicago may have a Web page, but middle- and high-school students in Glasgow, Ky., earn money designing Web sites for local businesses (see "Rural URLs," at left). And in Blacksburg, Va., of all places, 60 percent of the city's 35,000 residents have e-mail and discuss local issues, obtain restaurant coupons and pay their bills online.

As civic leaders discover the benefits of connecting city offices, emergency services and other parts of the community, cities are moving toward more extensive networks, says Dale Bowen, business manager of Public Technology Inc., which works with municipalities to integrate communications technologies. In smaller towns, revamping the infrastructure is easier, and high-tech offerings may attract new residents and businesses.

High-tech is part of the lure of Walt Disney Co.'s yet-to-be-built community, Celebration, Fla. Disney's $2.5 billion development, which is expected to draw 20,000 residents, will include Celebration Health, a high-tech health-care facility operated by Orlando's Florida Hospital that will offer access to patient records and images online as well as telephone preregistration. The city's school system will also be wired into the city's broadband server (installed by AT&T), and ISDN lines will run to every home.

Austin, Texas, is another community getting wired. Work is progressing on a

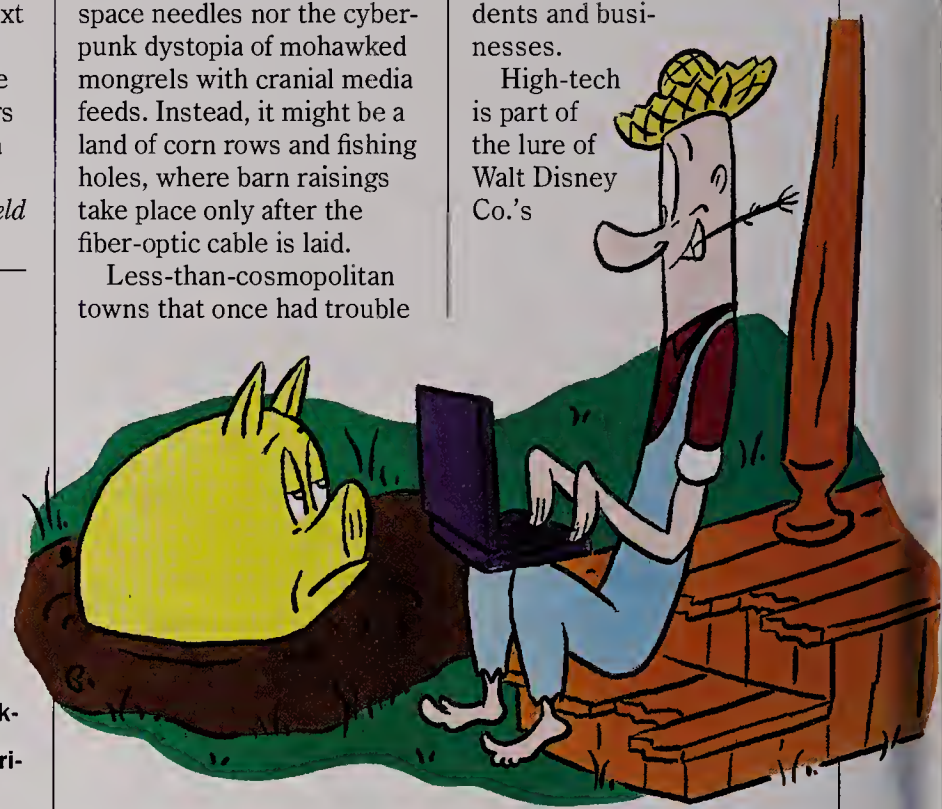

ILLUSTRATION BY PHIL MARDEN

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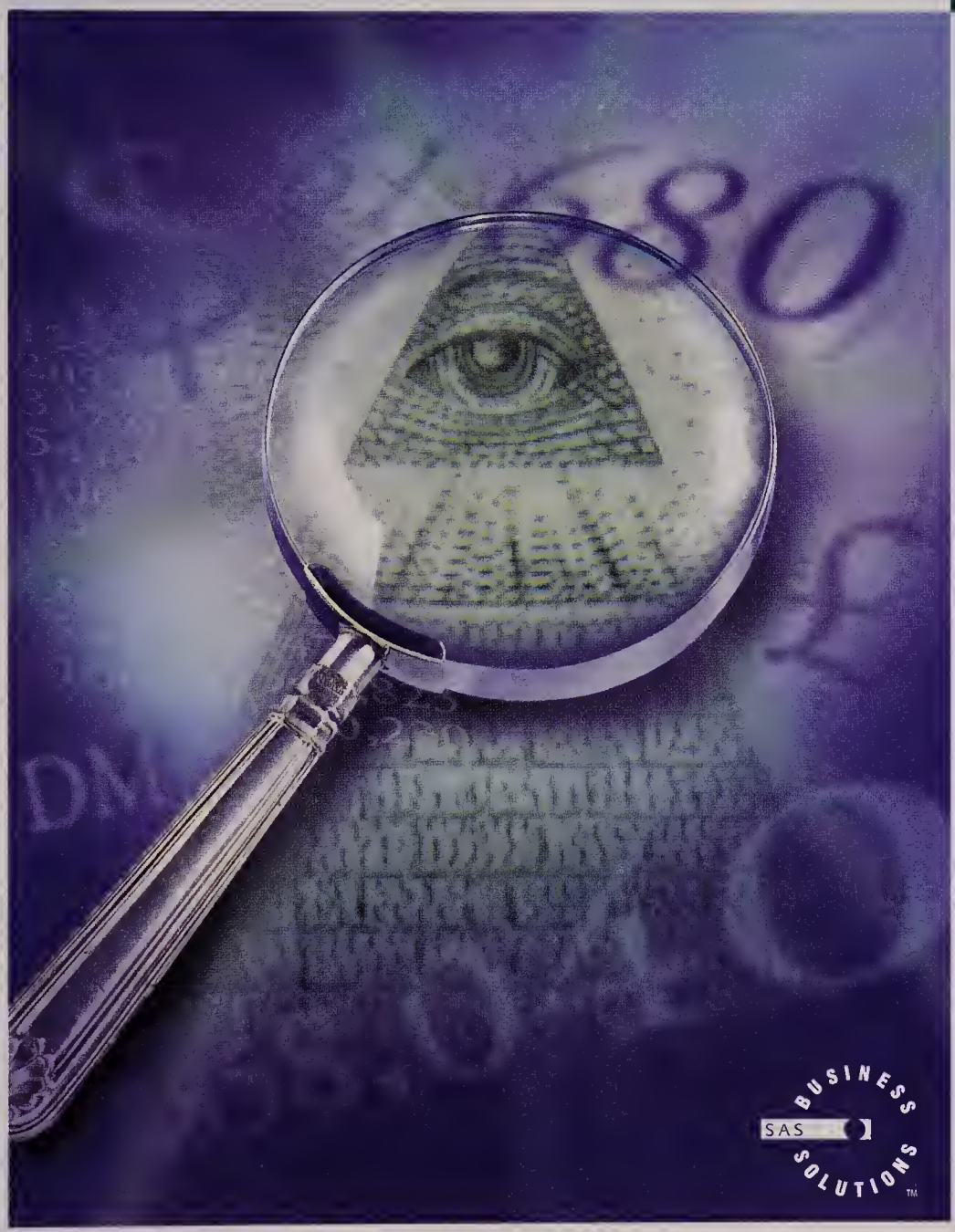

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TRENDLINES

$15 million, 300-mile, hybrid fiber-coaxial cable network connecting more than 300 sites will provide telephone, data and video services for the city of Austin, the Austin Independent School District, Austin Community College, the University of Texas, Travis County, the Lower Colorado River Authority and the state of Texas. By the end of the project, the broadband Greater Austin Area Telecommunications Network (GAATN) will provide 200 locations with advanced digital voice, data and video services.

Officials plan to expand the services to people outside the city as well, says John Edmonds, manager of fiber systems for the Lower Colorado River Authority. "Our intention is to facilitate the growth of technological services in rural communities," he says.

–Heath Row

DID YOU KNOW...

ELECTRONIC JOHN HANCOCK

Utah adopted its Digital Signature Act (the "1995 Utah Act") on February 27, 1995. Utah was the first legal system in the world to adopt a comprehensive statute making the use of digital signatures legally binding. http://www.state.ut.us/ccjj/digsig/default.htm.

SOURCE: IRS (*WWW.IRS.USTREAS.GOV*)

PROTECTING CHILDREN

BETTER CASE SCENARIOS

An emergency room physician treats a child for bruises. Suspecting the toddler might have been abused, he calls the state child welfare agency. The incident does not seem dire, certainly not life-threatening, but the caseworker who picks up the phone is unaware the child has been treated for bruises five times in the past year and that doctors had consistently suspected abuse.

With a backlog of cases that seem more pressing, the caseworker schedules an investigation for the following week.

Two days later, the child is found beaten to death.

Tragic scenarios like this one appear on the front pages of newspapers all too frequently. What makes these tragedies particularly sad is that with timely access to critical information, caseworkers can often intervene in time. An electronically available, detailed case history can alert a caseworker if a child's bruises warrant immediate investigation because of a pattern of abuse. New Mexico is the

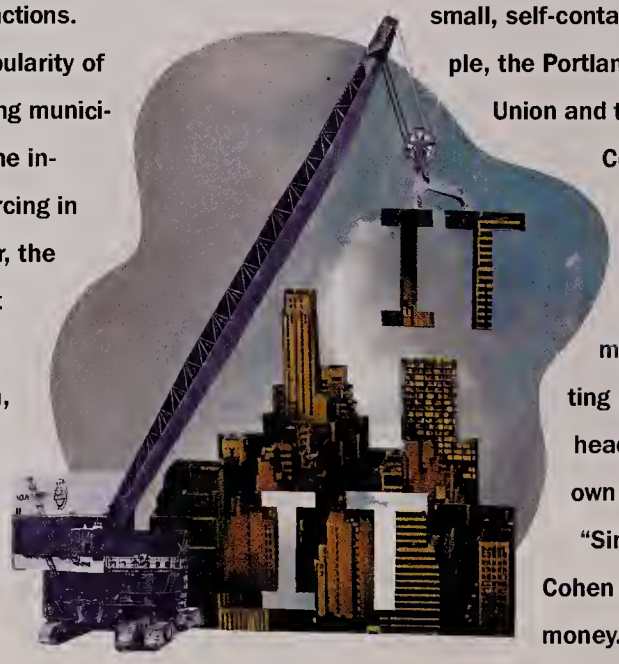
CY THEY'RE TAKING THE IT OUT OF CITY

Indianapolis's civic leaders may not have handed over the keys to the city, but they have handed over the keys to the city's IT. For about eight months now, the city has been outsourcing to Systems & Computer Technology (SCT) all of its network management, desktop and LAN management, data-center operations and help desk functions.

Though the popularity of outsourcing among municipalities mirrors the increase in outsourcing in the private sector, the deal is somewhat unique in scale, says Linda Cohen, research director for the government External Service Providers unit of Gartner Group in Stamford, Conn,

"It's new wave," Cohen says. "[To outsource all services as a package] means trying to aggregate all the data and delivery of IT service. That kind of coordination has to come from many organizations. It's tough to do."

More commonly, municipalities parcel out small, self-contained pieces of IT; for example, the Portland Postal Employees Credit Union and the Ohio State Student Aid Commission both contract with EDS Corp. But no matter how they scrape it off their plates, more and more municipalities are getting rid of the responsibility and headache of overseeing their own IT.



"Simply, they can't keep up," Cohen says. "They don't have the money."

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latest state to turn to an automated case-tracking system in an effort to prevent these tragedies and aid overburdened caseworkers. Connecticut, Rhode Island and Alaska also have similar programs underway. New Mexico will transfer its records on 60,000 adults and children from paper files to a client/server case-tracking system, says Heather Wilson, secretary of New Mexico's Children, Youth and Families Department. Currently, department workers are hampered by a paper file system that sometimes causes caseworkers to "lose track of the details" of investigations, Wilson says.

The New Mexico Family Automated Client Tracking System (FACTS) is powered by a Hewlett-Packard 9000 server and Sybase database at a central data center in Albuquerque accessed by LANs at local offices. The software was designed by American Management Systems (AMS) Inc. of Fairfax, Va. The system should improve productivity and effectiveness and prevent a few tragedies when it goes online this fall, says Wilson.

At the core of this information management crisis is an increase in reported child abuse cases in many states that has not been matched by an increase in the number of social workers, says Donna Morea, vice president of AMS's human services practice. By some estimates, the average caseworker spends about 80 percent of his or her time on paperwork and only 20 percent on serving clients directly, she says. Systems such as FACTS can shift that balance to give caseworkers a better chance of saving lives.

Expressing Themselves

"Quick" and "easy" aren't likely to be the first two words you would pick to describe a transaction with the typical human resources department—especially if that HR department is attached to a government bureaucracy. But a multiagency partnership at the federal level has produced a system that allows more than 450,000 employees to conduct most standard HR business using an 800 number or a touch-screen kiosk.

The system, called Employee Express, allows federal employees to make changes to their addresses, direct deposit information, voluntary allotments, and federal and state tax withholding information. Plans are in the works to develop a PC version of the system and to add features such as health benefits selection, a service that would electronically deliver employees' choices directly to service providers.

Twenty-five agencies are involved in the program, launched in May 1995. Agencies have pooled funds for the project—about $63,000 each for the initial pilot, 11 cents per user for maintenance and an additional $38,600 apiece for ongoing development.

The functions that can be carried out by the system constitute about one-third of the workload of a human resources office, says Lynne Doupont, project manager. She says the primary benefit of Employee Express is not savings but survival.

"All the federal agencies have already taken cuts in their human resources budgets of about 40 percent," Doupont says. "What this does is allow the business to exist and continue."

The code for the system was written by the IS group in the U.S. Office of Personnel Management's division of employment services in Macon, Ga. Though the system currently outperforms available commercial software, Doupont says any talk about marketing the product to businesses has centered on recovering costs—the government isn't allowed to turn a profit.

Stumping Online

Additional 1996 Election Web Sites

- **WebArchive96** *(www.archive.org)*: **Online presidential election archive maintained by the Smithsonian Institution's National Museum of American History**
- **Nerd World Election Guide** *(www.nerdworld.com/nw600.html)*: **Nerd World Media's index to scads of other Web sites on anything you want to know about U.S. politics**
- **NetVote** *(www.ypn.com/vote)*: **From the creators of NetGuide; includes hundreds of sites where you can track candidates and download speeches, photos and video clips**
- **ElectionLine** *(www.electionline.com)*: **Joint effort of ABC News, *The Washington Post* and the American Political Network, including the political content of *Newsweek* and the *Los Angeles Times***
- **Campaign Central** *(www.clark.net/ccentral)*: **Clearinghouse of information regarding campaigns all over the United States; includes the online "Netpolitics Magazine"**
- **The National Political Index** *(www.politicalindex.com)*: **Online resource that boasts 3,500 political Web site hyperlinks; will help develop free Web pages for any candidate for any U.S. political office and will even help round up campaign volunteers and donors**
- **Hillary's Hair** *(www.hillaryshair.com)*: **Virtual tour of the First Lady's tresses**

DID YOU KNOW...

DIGITAL HALF-TIME

Filing your tax return electronically will cut in half your wait for a refund, the Internal Revenue Service says. Taxpayers who mail their returns will wait a maximum of 40 days for that check, but electronic filers will have their refunds within three weeks, barring an audit.

SOURCE: IRS (*WWW.IRS.USTREAS.GOV*)

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No Cover, No Minimum

CIOs in public service may ensure that IT will be the cutting edge and not the cutting wedge of social progress

BY GARY CHAPMAN

Public sector CIOs at every level of government are under increasing pressure to use the Internet to serve the public. The origins of that pressure are varied and include the desire for efficiency, which often means reducing visits to public buildings or reducing telephone calls to agency personnel, or just the desire to give the agency a high-tech "look" and to keep up with the times. Those pressures are producing a revolution in how public sector CIOs view their jobs and their shops' missions. Like their counterparts in the private sector, they are transforming from data processing managers to online publishers.

However, unlike information managers in the private sector, government CIOs must serve all citizens equally, whether or not they have a computer or an Internet connection. And right now, only a fraction of the American public uses the Internet. Although the Internet-using population has doubled every year since 1988, only about 10 million Americans are Internet users. Out of a population of about 265 million people, that translates into an Internet-using portion of about 4 percent. While we can expect increasing numbers of people to use the Internet in coming years, it will still take a long time for a majority of Americans to become network users, and many will never go online.

By now, most people are familiar with the troubling U.S. income data of the past two decades. Real wages for 80 percent of Americans have been stagnant or, in some cases, falling. A sizable segment of the U.S. population, those who are unskilled and without higher education, have seen their wages decrease about 20 percent over the past 20 years. And another large portion of the working population is stuck at bare subsistence wages—about 11 million Americans work full time at the minimum wage of $4.25 per hour, giving them an annual income of just over $8,000. These people are not buying computers, let alone setting up Internet accounts. They're having trouble putting food on the table or clothing their kids for school.

In July 1995, the U.S. Department of Commerce published a survey of computer and network use in poor and rural communities. The report, "Falling Through the Net," confirmed what most people suspected: Personal computer ownership and telecommunications services are far less likely to be found in poor neighborhoods than elsewhere in the United States. The report revealed just how dramatic this disparity really is. In households with annual income above $50,000, home ownership of a computer approached 50 percent. In households with annual income below $10,000, PC ownership was about 7 percent—and that figure included students, who are often expected to own a personal computer for their schoolwork. In effect, computer use, and especially Internet use,

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DID YOU KNOW...

THE WIRED MINORITY

Computers were present in 22,605 U.S. households, or about 23 percent, according to 1993 census data. Thirty-eight percent of whites reported using a computer someplace in their daily lives. Among blacks and Hispanics, the proportion was lower, 25 and 22 percent, respectively.

SOURCE: U.S. BUREAU OF THE CENSUS (*WWW.CENSUS.GOV*)

in poor households is nonexistent.

Thus, public sector CIOs face a paradox: increasing pressure to develop online systems to serve the public when an overwhelming majority of government service clients do not use online services or have access to them. Offering the means over the Internet for citizens to pay parking tickets, check public information or arrange a public transit itinerary is a useful and productive endeavor for government agencies. But access to these services requires a sort of technology "cover charge" if all citizens don't have reasonably equal entry to cyberspace.

If equalized home ownership of PCs and network connections is unlikely without major shifts in the wage structure of the United States, what is the solution to the problem?

Poor people often don't own telephones or automobiles, because they can't afford them. But they can and do use telephones and public transportation on a pay-per-use basis. If the information superhighway is going to be as important to each citizen's life as we think, we need to develop an analog for network access to public transit or public telephones. We don't yet have a consensus for a model of public access to network services in the same way we have one for public transit. But promising possibilities exist throughout the United States.

Two models deserve attention: community computing centers and community networks. Both are described in rich detail in a new and valuable book, *New Community Networks: Wired for Change,* by Douglas Schuler (Addison Wesley, 1996). Schuler, the chairman of Computer Professionals for Social Responsibility, describes urban and rural initiatives in the United States that aim to bring computers, networking and associated skills to people who are not part of the typical "user community."

Community computing centers pool computer and networking resources in publicly accessible sites, and they typically provide entry-level classes in how to use software and the Internet. One of the first of these was the Playing to Win center, started by Antonia Stone in a Harlem housing project. Playing to Win has spread throughout the Northeast; with help from the National Science Foundation, the center hopes to establish a network of up to 350 other centers. Other community computing centers include the Computers and You center at Glide Memorial Church in the Tenderloin district of San Francisco and Plugged In, located in East Palo Alto, Calif. The Regional Access Information Infrastructure Link (RAIIL) Project in Central Texas plans to make rural schools along the Lower Colorado River into centers of community computing for small farming towns, such as La Grange, Dimebox and Comfort.

Community networks now number over 200 in the United States, says Schuler, and the numbers are growing rapidly. Many of them are modeled after the Free-Net concept, an idea started and developed in Cleveland by Tom Grundner of the National Public Telecomputing Network. Free-Net is a low-cost, entry-level provider that, like National Public Radio, generates a low-cost feed enabling inexpensive community networking. Free-Nets are found in cities and rural areas throughout the country such as PrairieNet in Champaign-Urbana, Ill.; SalsaNet in San Antonio; MetroNet in Dallas; Seattle Community Network; the statewide Big Sky Telegraph located in Dillon, Mont.; and Los Angeles Free-Net. People who work on community networks are linked by an Internet list server called Communet, which has thousands of subscribers.

The services provided on community networks create a marriage between community and technology, reports Schuler. Rather than assume that the model of networking we should target for the future is one of isolated citizens accessing the Internet at home and picking and choosing services like atomized consumers, the community network model poses a network in the service of citizenship. And the community network movement assumes that everyone should have some type of network access and shouldn't have to wait until it can be worked into a household budget.

One service provided by community networks is access to basic government information, such as directories of government agencies, calendars of local civic events or "process trees" that show how to manage applications for welfare, Social Security or car registration. Bus schedules, child-care pools or homework assignments for local schools can be published on the community network.

If we use an expanded vision of community—so that terminals can be located not just at schools, libraries and government offices but in laundromats, bus stops, grocery stores and community centers and other community "hang outs"—and if we combine community computing centers with a sustainable community network, we produce a public-access model that may help alleviate the trends that are currently turning us into a society of information "haves" and "have-nots." Given the new mission of government CIOs and the imperative of serving all citizens equally, government information managers should be aware of these efforts in their communities and should support them in any way possible. CIO

Gary Chapman is the director of The 21st Century Project, a research and education program at the LBJ School of Public Affairs at the University of Texas in Austin that investigates new directions in science and technology policy. He can be reached via e-mail at gary.chapman@mail.utexas.edu.

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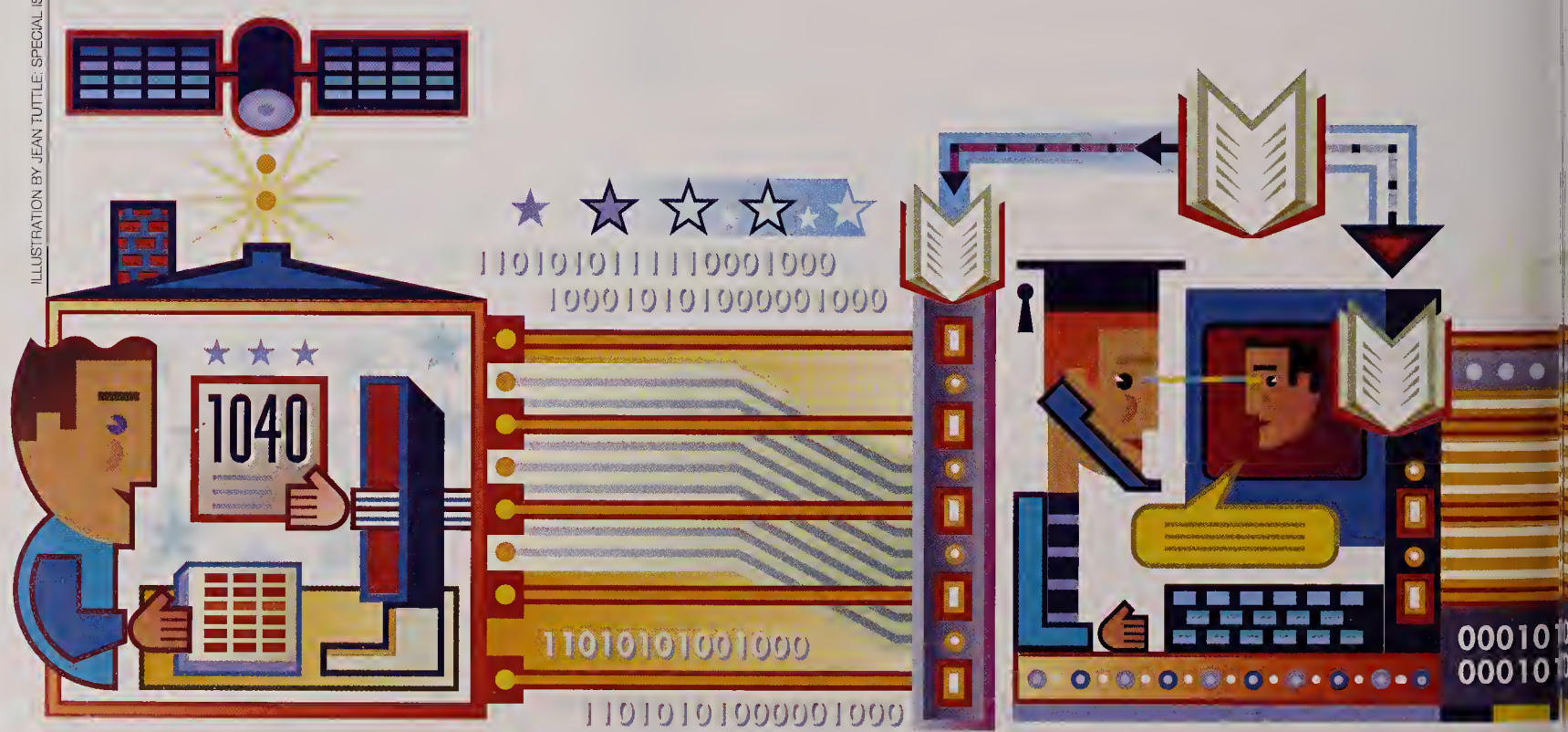
INTRODUCTION

Public-Address

■ **AWAKENED BY CALLS FOR GOVERNMENTAL REFORM, PUBLIC SECTOR INFORMATION SYSTEMS ARE BEGINNING TO TACKLE INBRED INEFFICIENCIES AND ADVANCE THE CENTURIES-OLD QUEST TO FORM A MORE PERFECT UNION**

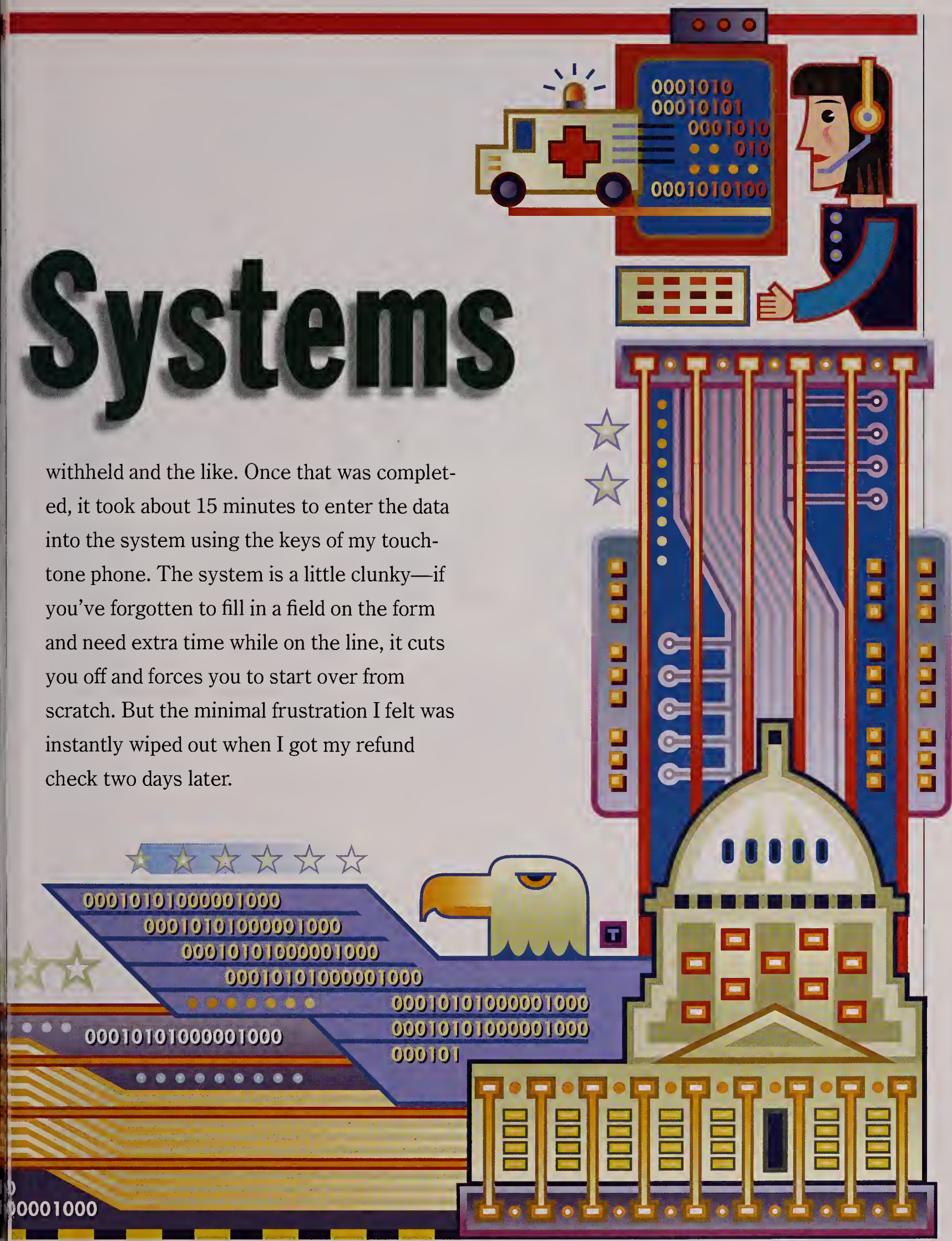
Although the words "efficient" and "government" traditionally go together as well as "pancakes" and "vinegar," it takes only a few IT-enabled positive experiences to soften one's attitude toward government. Take your tax return, for example. I filed my Massachusetts state income tax return by phone this year. Before dialing the Telefile number, I filled out a worksheet containing spaces for income, exemptions, taxes

ILLUSTRATION BY JEAN TUTTLE; SPECIAL ISSUE LOGO BY DAN PICASSO



Systems

withheld and the like. Once that was completed, it took about 15 minutes to enter the data into the system using the keys of my touch-tone phone. The system is a little clunky—if you've forgotten to fill in a field on the form and need extra time while on the line, it cuts you off and forces you to start over from scratch. But the minimal frustration I felt was instantly wiped out when I got my refund check two days later.



DID YOU KNOW...

GROWING USER BASE

As of April 30, 1996, the U.S. resident population totaled 264,743,415. The Census Bureau's population projection for the next decade ranges from 278 million to 299 million.

SOURCE: U.S. BUREAU OF THE CENSUS (WWW.CENSUS.GOV)

Imagine—a tax refund in two days! And next year we may get instant refunds via electronic deposit. Turning around a complicated transaction that fast is a rarity even in the private sector. Governments, hampered by shriveling budgets and institutionalized bureaucratic inertia, face daunting challenges when aspiring to such operational excellence. But IT, when applied intelligently, can be a great leveler. That's one reason many public sector organizations—federal, state and local—have created the position of chief information officer in recent years. Because these positions are relatively new to the public sector, the pioneering CIOs will set the tone for the future. They will define the CIO role in government and have a chance to advance the profession in the public view. Among their more formidable challenges will be devolution (relegating federal government responsibilities to states and cities), preparing the architecture for an online government, coping with government reform initiatives and cutting costs to match shrinking budgets. Those challenges are fraught with hazards—high profile screw-ups incur merciless scrutiny in the press, provoke taxpayer wrath and can be major political liabilities for the elected officials to whom the CIOs often answer.

Despite such perils, the numerous opportunities to improve the public's opinion of government generate a palpable enthusiasm among public sector IT managers. At a meeting of the National Association of State Information Resource Executives (NASIRE) in Utah in April, a number of state CIOs spoke excitedly about their plans to use the Internet to expand educational opportunities and improve government services. They say the technology will help them make a high-impact, visible difference for their constituents.

Indeed, when CIOs enable citizens to get a quick tax refund, reduce the time travelers spend in U.S. Customs lines from 45 to 5 minutes or save lives via a computer-aided emergency dispatch system, they have a measurable impact on the quality of life for thousands, even millions, of citizen-users. This special issue explores the ways in which technology and CIOs at all levels of government are making a difference and how they may have a thing or two to teach the private sector about the politics of delivering high quality services.

—Peter Fabris, staff writer

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INSIDE

CONFERENCE OVERVIEW
Joseph L. Levy, Lynda Rosenthal & Lew McCreary

"SERIOUS BUSINESS"
Even as consumer applications float tantalizingly on the horizon, companies are learning to exploit the Internet as a practical information tool.

AGENDA
Detailed information about each general and concurrent session and scheduled activities throughout the conference.

CORPORATE HOSTS
During the conference, our Corporate Hosts, a select group of innovative, visionary companies, will display a wide range of solutions to address strategic and operational Internet applications.

ENROLLMENT FORM
Complete the online enrollment form on our Web site at http://www.cio.com or fax the completed form on the back of this brochure to 508-879-7720. You can also call us at 800-355-0246.

CONFERENCE OVERVIEW

The Web and the Internet have transcended surfing and chat groups to become incubators of serious commercial innovation. Pioneering enterprises are busily hatching the future of wired and interactive business conduct. But only some of these ventures will prove to be successful and profitable. Thus, organizations must prepare themselves now for the transformation of business processes which the Net and Web are driving.

The first conference in our *WebMaster Perspectives*℠ Series, **Surfing the Business Potential** explores how organizations are transforming business processes via the Web, Internet and intranet. Join your peers, information technology and business executives and corporate webmasters to find out how some of the leading business visionaries and innovators are profiting by pushing the promise of the Web and the Internet to new levels.

Our keynote speaker will be **George Gilder**, author of *Telecosm*, and senior fellow of The Discovery Institute. **Don Tapscott**, author of the new bestseller, *The Digital Economy: Promise and Peril in an Age of Networked Intelligence* will moderate the *WebMaster Perspectives* conference and set the stage for our discussions.

To secure your place at **Surfing the Business Potential**, complete the online enrollment form at http://www.cio.com or complete the enrollment form on the back of this brochure and fax it to us at 508-879-7720. You can also call us at 800-355-0246. Be sure to make your hotel reservations as soon as possible by calling the Westin St. Francis at 415-397-7000. The hotel **will** sell out!

Regards,

Joseph L. Levy
Group Publisher & President

Lynda Rosenthal
Senior Vice President & General Manager Executive Programs

Lew McCreary
Publisher & Editor-in-Chief WebMaster Magazine

Serious Business

Even as consumer applications float tantalizingly on the horizon, companies are learning to exploit the Internet as a practical business tool

By Leigh Buchanan

Until recently, corporate Web champions have sounded like frustrated parents, repeating over and over to their peers and superiors: "It's not a toy. It's not a toy."

Those days aren't entirely over, but the Internet is shedding the anarchic — even frivolous — image created by all the hoopla over pizza, pornography and e-mail for the White House cat. "Those who think the Internet is overhyped and that it will become passè are deeply misled," says Don Tapscott, a Toronto-based consultant and the author of *The Digital Economy: Promise and Peril in the Age of Networked Intelligence.* "Naysaysers may provide comfort to the corporate Internet laggards of today, but this comfort will ultimately prove hollow and costly."

One reason the Net is suddenly being taken so seriously is the shift in focus from consumer to business applications. Yes, the retail market is coming, many still believe, and some merchants experimenting with online channels are reporting more repeat business, increased customer satisfaction and improved margins. Unfortunately, such success stories are not abundant. The majority of e-stores are facing the hard realities of present-day Internet commerce: Web access is far from ubiquitous in households, payment schemes are still in their adolescence and the break-out business model has yet to be identified. In addition, there's what Jim Sterne, president of Target Marketing of Santa Barbara, calls "the vicious cycle: People are not going to the Web to buy things, because there's not enough things to buy." As Netscape Communications' Chairman Jim Clark — someone with an enormous stake in the success of electronic commerce — recently told a conference crowd, "The consumer-oriented Internet is the future."

If full-blooded electronic commerce thrives anywhere in the next five years, it will do so in the business-to-business environment, experts predict. Increasingly, companies large and small are waking up to the implications of a public network for marketing, customer service, distribution, sales support and even EDI. The importance of such dealings is apparent in the Net's growing prevalence in corporate procurement departments, where employees are using it to compare prices, facilitate flexible supplier relationships and even configure products. The success of numerous technology and service vendors on the Net — as well as such distributor sites as *www.industry.com* and *www.marshall.com*, which deal in manufacturing products and electronic components, respectively — demonstrate that businesses are already using the Web to make purchasing decisions and, in some cases, to place orders.

In addition, the ability to provide reliable online support is becoming a selling point for many suppliers, most notably software companies that can send patches and updates over the wires. These motivators are enhanced by the low cost of entry (plenty of corporate Web sites come in at $100,000 or less, although fully staffed and featured transactional sites can costs upward of $2 million) and the promise of reduced printing and service expenses.

But while the question of whether to get on the Web is disappearing, the question of what to do there is not. Now that so many businesses have their home pages (more than one-third of U.S. companies, according to marketing firm Straightline International) and the fascination with being "Cool Site of the Day" has started to abate, a new holy grail is emerging: utility. Fortunately, that grail is relatively achievable, especially for companies with a core competence in technology. "It's easier to create a Web site that helps somebody get their job done than it is to create a Web site that's of interest to consumers," says Target Marketing's Sterne. "You have to be informative and helpful, you don't have to be entertaining."

At a minimum, being helpful means providing information and answers to questions, which most Web sites already do. But services like Federal Express' package-tracking — routinely cited as a paragon of Web utility — have effectively raised the bar. Small and large companies alike are looking for ways to transfer the services they already provide to this new medium. And the most forward

thinking are devising brand-new services that would be difficult or impossible to offer without the Web: Marshall Industries, for example, lets customers perform computer-aided engineering on its site.

A perfect example of utility achieved is Holiday Inn's Web site, the first in the hotel industry to offer online reservations. The site is a demonstrable cost cutter: Holiday Inn saves 75 percent on every reservation made through that medium as opposed to over the phone or through a global distribution system like Sabre. More exciting, perhaps, is the fact that almost all the bookings the company receives over the Net are new customers, the vast majority of them businesspeople.

Currently, the Holiday Inn site pays for itself, but it should do more than that if usage increases. Director of Emerging Technologies Les Ottolenghi predicts that will happen as Web access becomes more ubiquitous. "I look at it as strictly a numbers game over time," he explains. "The number of digital devices that let you connect to the Web in wired or wireless form will continue to grow. And of course the Internet won't be the Internet: It'll be the Internet-plus....It's like saying TV will always be black-and-white TV with one or two major broadcasters. Well, now we know it as TV, pay TV, cable TV, near video-on-demand TV. The same thing will happen with the Web."

Dell Computer Corp.'s Web site focuses more on serving existing customers than on winning new ones, but that strategy "increases our brand awareness among non-customers who come to the site and see what you get when you do business with Dell," says Kenneth Hill, the company's global online business development manager. Dell conducted extensive customer research to determine what types of functionality would be most valuable before launching its site in December: Its Net offerings now include high-end help-desk support, online configuration utilities and file libraries for buyer upgrades, among other things.

"The purchase price of a PC in the business world represents only 16 percent of the cost of ownership," says Hill. "By focusing on servicing the product, keeping it up to date and answering user questions through the Web, we can dramatically lower the three-year life-cycle costs of a PC."

Utility is less a challenge for designers of corporate intranets, which are useful almost by definition since they help an organization's employees perform their jobs better.

Intranets are proving to be the fastest way to implement technology to support redesigned business processes.

Currently, about a quarter of U.S. companies have deployed internal Web applications, according to Forrester Research, and another 40 percent are considering doing so. Those applications have generally involved collecting and distributing information, such as employee directories and divisional news. But now people are starting to recognize the Web's ability to integrate with internal systems and to integrate those systems with one another.

That development could have a profound effect on enterprisewide collaboration as the Web increasingly becomes the least-common-denominator vehicle for information sharing. The Lotus Notes versus the Web debate happening in many companies today testifies to how robust intranet technology is expected to become, and some experts predict that more than 100 million workers will be using the Web to collaborate by the year 2000. But the Web is no panacea, and there may exist problems for which it will never be the best solution. With that in mind, some analysts are beginning to describe a model in which traditional groupware survives but serves only the 15 percent of a company's employees are knowledge workers while intranets cost-effectively take care of everyone else.

Tapscott views intranets as the logical extension of open systems: software environments based on standards that enable the portability of applications and the interoperability of systems. And while he doesn't believe intranets solve the historical problem of integrating legacy operational databases, "they can be of huge benefit in document-oriented challenges," he says. "Companies such as Hewlett-Packard are using intranets to manage tens of thousands of documents; consulting companies are using them to attack the problem of knowledge management...[and they] are also proving to be the fast way to implement technology to support redesigned business processes."

A year ago, people were still talking about intranets as mere steppingstones on the way to "real" applications on the external Net. Today, many more describe both types of initiatives as being crucial to their organizations. The challenge now becomes integrating the two sets of talents and technologies to create a consistent, effective Web interface for users inside and outside of the company.

But that challenge, and all the others that go along with conducting Web business, can be faced only after the organization has accepted the rationale for getting on the Internet in the first place. As pragmatic applications become more plentiful and companies slowly — but surely — begin realizing quantifiable ROI, the decision to do so becomes easier to make.

CONFERENCE SESSIONS

SUNDAY, AUGUST 11

3:00pm-6:00pm
Conference Registration

7:00pm-9:00pm
Networking Reception

9:00pm-12:00am
Networking/Hospitality

MONDAY, AUGUST 12

7:00am-8:00am
Breakfast

Joseph L. Levy

8:00am-8:15am
Welcome & Opening Remarks
JOSEPH L. LEVY
Group Publisher & President
CIO Communications, Inc.

LEW McCREARY
Publisher & Editor-in-Chief
WebMaster Magazine

Lew McCreary

8:15am-9:15am
Challenging Tradition: The New Web-Enabled Business Model
DON TAPSCOTT
Conference Moderator
Author
The Digital Economy: Promise and Peril in an Age of Networked Intelligence

Don Tapscott

In this digital economy, individuals and enterprises create wealth by applying knowledge, networked human intelligence, and effort to manufacturing, agriculture and services. The players, dynamics, rules and requirements for survival and success are all changing. Such a shift in economic and social relationships is causing every company to think far beyond "reengineering" to transform itself for the new Web-enabled business model. A new enterprise is emerging –- the internetworked business. The new media is radically changing the operation of businesses, the nature of the economy and the challenges facing business leaders.

Jim Sterne

9:15am-10:15am
Winning the Internet Marketing Lottery
JIM STERNE
President
Target Marketing of Santa Barbara

The Internet lets you treat your customers the way they want to be treated -- as unique individuals with unique needs. The ability to personally know your customers disappeared after the Industrial Revolution brought inexpensive transportation and mass production. We measure a small sample in order to predict the needs and desires of the many. We now we have the means to learn and remember each individual and each of their transactions. The winners of the marketing game will be the ones with the largest databases and the most perceptive software. The Web lets you implement that dream today.

MONDAY, AUGUST 12

10:15 am-10:45am
Coffee Break

Shikhar Ghosh

10:45am-12:15pm
Visionary Roundtable: The Web as an Engine for Business Mutation
MODERATED BY LEW McCREARY

Panelists:

SHIKHAR GHOSH
Chairman & Co-Founder
Open Market, Inc.

Thomas P. Kehler

THOMAS P. KEHLER
President & CEO
Connect, Inc.

JOHN KLUG
Founder & Chairman
Customer Communications Group

John Klug

ALEX ZOGHLIN
President, Director of Technology
Neoglyphics Media Corporation

The potential of information technology to transform business processes remains a powerful idea that some organizations neglect. The emergence of the World Wide Web as a serious business platform may give reengineering a new lease. In the open, flexible, non-proprietary (and hence less costly) Web paradigm, systems remain works in progress that adapt organically to changing customer needs and business requirements. This roundtable features four Web development visionaries who will cite real-world examples and ways in which the Web's unique properties will revolutionize how you do business.

Alex Zoghin

12:15pm-1:30pm
Luncheon

Larry Geisel

1:30pm-2:30pm
Is the Centralized Control of Information A Dead Duck?
LARRY GEISEL
Senior Vice President
Information Technology & CIO
Netscape Communications Corporation

To compete successfully in the information economy, companies must transform their underlying capabilities. The Internet changes all our assumptions. Private Internet networks, or Intranets, offer a flexible foundation for connecting knowledge workers and information to build a responsive, agile organization - far removed from the rigid, hierarchical structures of the past. The CIO must manage enterprise technology in this environment.

CONFERENCE SESSIONS

MONDAY, AUGUST 12

2:30pm-2:45pm
Coffee Break

2:45pm-3:45pm
Concurrent Sessions

4:00pm-5:00pm
Concurrent Sessions – Repeated

5:00pm-6:30pm
Reception

TUESDAY, AUGUST 13

7:00am-8:00am
Breakfast

Marc Sokol

8:00am-9:00am
The Web Feat: Corporate IT Embraces the Internet
MARC SOKOL
Vice President, Advanced Technology
Computer Associates International, Inc.

As organizations evolve to exploit the intranet and internet, they must create, manage and deploy new applications and media-rich content. Aggressive companies are extending their systems and network infrastructures to better embrace internal work groups, suppliers, partners, customers and prospective customers through Web enablement. This presentation will utilize real-life examples of how Fortune 500 organizations successfully use Internet-based enterprise systems.

Les Ottolenghi

9:00am-10:00am
Sleeping with the Internet: Using the Web to Increase ROI
LES OTTOLENGHI
Director of Emerging Technologies
Holiday Inn Worldwide

The Internet is either hailed or derided by corporate strategists, marketers and technologists. Is it a mecca for future commerce, holding the promise of electronic markets and a radically altered competitive landscape? Or is the Internet just a passing fancy? Computing the ROI of using the Internet compels a diversity of thought in a new territory where only antiquated tools force analysis which defies the logic, practices and understanding of the value the Internet holds. In this session, you will hear why considerations like interactivity, intranets and technology adoption by society are only a few reasons your company might find itself in bed with the Internet.

10:00am-10:30am
Coffee Break

TUESDAY, AUGUST 13

Philip L. Terry

10:30am-11:30am
Searching for Facts in All the Right Places
PHILIP L. TERRY
Knowledge Strategist
Moody's Investors Service

Creating environments for financial and business executives to effectively search the Web requires a variety of skills. Even within an investors' service, information needs vary greatly from analyst to analyst. Matching analyst to database or site requires knowledge not only of the organization's direction and strategy, but also the needs of each individual analyst's focus. Further complicating this task is the need to understand and internally market the Internet and its changing resources.

Dr. Robert E. Miller

11:30am-12:30pm
Transforming a Hospital to a Truly Integrated Delivery System: Beyond the Internet to the Intranet
DR. ROBERT E. MILLER
Director, Pathology Informatics
Johns Hopkins Health System

Internet-enabled electronic commerce technologies are making it easier to communicate with both internal and external customers and other business partners. Leading IS organizations have discovered that the same interfaces and navigation tools that have made the Internet an indispensable communication link with third-party business partners can deliver comparable benefits within their own organizations. This session will illustrate how Johns Hopkins is leveraging the Internet to achieve dramatic performance breakthroughs over the traditional approach of investing millions during an extended period of years.

12:30pm-1:15pm
Luncheon

1:15pm-2:15pm
Concurrent Sessions

2:15pm-3:15pm
Concurrent Sessions – Repeated

3:15pm-3:30pm
Coffee Break

George Gilder

3:30pm-5:30pm
The Web Changes Everything: Disintermediation & Beyond
GEORGE GILDER
Editor & Author
Telecosm
Senior Fellow
The Discovery Institute

The elimination of a middleman - putting the buyer and seller into direct contact - is a basic definition of

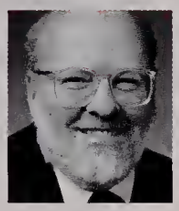
CONFERENCE SESSIONS

TUESDAY, AUGUST 13

disintermediation. Through new distribution and marketing channels, most prominently the World Wide Web, sellers are gaining direct access to purchasers without an intermediary. Those organizations that add value or create new business services will capitalize on this phenomenon rather than vanish. Will your enterprise flourish or perish? George Gilder will create a colorful picture of how to tap into future applications as sources of profit for information entrepreneurs.

5:30pm–6:30pm
Reception with George Gilder

WEDNESDAY, AUGUST 14


Tim Horgan

Matthew Cutler

Randy Hinrichs

David Williams

Andy Greenawalt

7:00am–8:00am
Breakfast

8:00am–9:00am
Delivering Business Value Roundtable: The Emerging Roles of Webmasters
MODERATED BY TIM HORGAN
Webmaster
CIO Communications, Inc.

Panelists:

MATTHEW CUTLER
Chairman
Webmaster's Guild
Founder & Director of Business Development
net.Genesis Corporation

RANDY HINRICHS
Internet Author
Web Design: A Different Multimedia

DAVE WILLIAMS
Webmaster
Remedy Corporation

As the Web becomes widely used and accepted as an increasingly important business tool, the roles, responsibilities and challenges of the webmaster evolve and change. This requires that the webmaster understand and support the needs of the business, lead the effort to bring the Web to the corporate masses and avoid the political traps that come with information and power. This panel will examine the technical, political and organizational challenges faced by Webmasters and the strategies real-world webmasters have adopted.

9:00am–10:00am
Intranet Meets Internet: Unifying Development & Business Strategies
ANDY GREENAWALT
Vice President, Information Services Americas
Dell Computer Corporation

WEDNESDAY, AUGUST 14

Kenneth Hill

KENNETH HILL
Global Online Business Development Manager
Dell Computer Corporation

This session will compare and contrast the seemingly conflicting objectives between a large, structured IS organization and small, unstructured Web development teams. If your marketing department is starting to look like a "shadow IS" department, this session is for you. The session will cover business and IS strategies, risks, EDI/commerce, roles and responsibilities and how a leading direct manufacturer of personal computers has developed and executed a plan to address these issues.

10:00am–10:30am
Coffee Break

10:30am–11:30pm
CyberEthics for the New Medium
JOHN PERRY BARLOW
Cognitive Dissident
Electronic Frontier Foundation

Cyberspace is a social and economic space unlike any humans have ever inhabited before, seemingly immune to the laws of physical world goverments. Differing cultural notions of morality, previously insulated from one another by physical distance, are coming into increasing conflict in an environment where everywhere is everywhere. Against these limitations, the rule of law, as we've know it, may be diminished and replaced by the rule of ethics – ordering principles for behavior that arise from the collective culture of Cyberspace. Do such ethics already exist? Are they sufficiently robust to maintain something like civilization in the virtual world? These are the kinds of questions this session will tackle.

11:30am–12:00pm
Recap: Conference "Cliffs Notes"
DON TAPSCOTT

CONCURRENT SESSIONS

The Promise of Electronic Commerce: The BBN Vision
PRESENTED BY BBN PLANET

The Internet offers great promise as the infrastructure for a global electronic marketplace. For the promise to become reality, key infrastructural technologies must be in place: mechanisms to assure adequate bandwidth; network tools to assure quality; directory tools to help people find what they need; and public key infrastructure to support identification, authorization and privacy that, in combination, make the Internet secure. This session will discuss the BBN Planet vision for integrating and delivering the full array of electronic commerce services, in cooperation with other suppliers of key capabilities, to our customers on a global basis.

CONCURRENT SESSIONS

Michael Skubisz

Building Your Intranet
MICHAEL SKUBISZ
Director of Product Marketing
Cabletron Systems, Inc.

The key to the Internet lies within our internal corporate networks, or intranets. Intranets create a variety of challenges: security, management, capacity and, most importantly, cost. Intranets require a strong infrastructure that relies on switching, management and virtual networking. This session will address these issues by focusing on key infrastructure capabilities such as policy-based usage and security, management tools and network accounting. This informative session on building an intranet will help you find cost-effective solutions to your networking and business challenges.

Peter Solvik

Surfing on the Edge: High-Impact Business Applications on the Web
PETER SOLVIK
Vice President of Information Systems & CIO
Cisco Systems, Inc.

In addition to being the leading global supplier of internetworking solutions for the Internet, Cisco Systems has been an innovator in providing customer service, technical support and electronic commerce to its customers and partners via the World Wide Web. This session will review the business challenges that the company has faced in growing more than 1,000 percent in four years and how use of the Internet and corporate intranet have been key to a corporate-wide strategy to successfully scale and differentiate the company in a hypergrowth environment. The session will revolve around demonstrations of over 10 different Web-based Internet and intranet applications in use at Cisco today.

Marc Sokol

Netting Profits on the Web
MARC SOKOL
Vice President
Advanced Technology
Computer Associates International, Inc.

The explosion of the World Wide Web has created an unparalleled opportunity to reach new customers and expand into new markets. In this session, you will learn how to: implement and manage the industrial-strength infrastructure required for your Web presence; use state-of-the-art, object-oriented tools to author Net-enabled, multimedia applications that include video, sound and animation; and establish a database management system that is mission-critical, scaleable and self-manageable. This session will also discuss the three-dimensional, Real World Interface™ used to manage the entire infrastructure, including security, event and problem management, resource accounting and database monitoring.

Thomas P. Kehler

Creating a Virtual Sales Channel on the Internet
THOMAS P. KEHLER
President & CEO
Connect, Inc.

The market is now seeking a complete, secure Internet application that streamlines and automates the business-to-business sales channel for corporations, resellers and distributors. For the corporate developer, reseller and end-user alike, moving the power of today's complex custom order management systems to the Internet means better functionality, less expense, increased market share, and the ability to get up and running in a fraction of the time. This session will explore how Connect's Virtual Sales Channel™ is transforming business-to-business interactive commerce and reengineering the way in which goods are being distributed and sold.

David B. Fowler

Secure Desktop to Database Computing on the Web
DAVID B. FOWLER
Vice President, Sales and Marketing
Gradient Technologies, Inc.

Today's corporations need a new network paradigm that connects enterprises internally and externally, resulting in faster deployment of applications, broader – yet controlled – distribution of information, and better management and administration. At the same time, companies look to the World Wide Web to provide access to many sources of information. This can be done by combining the Internet with client/server computing, where the client is a standardized Web browser, the application server is a Web server and uses standard tools, and networks can be based on both LANs and WANs, public and private. This session will discuss how to make the Web a viable medium for communicating information securely and cost-effectively within and between enterprises.

Jan Silverman

Intranet/Internet Solutions for Business Advantage
JAN SILVERMAN
Director, Internet Solutions
Computer Systems Organization
Hewlett-Packard Company

This session will cover how Hewlett-Packard leverages intranet/Internet technologies to its own business advantage and the critical role security plays within those environments. Emphasis will be placed on HP's own use of its Intranet as well. The session also will present the company's strategy and offerings to help its customers implement intranet/Internet solutions to meet their internal business needs.

CONCURRENT SESSIONS

Mark N. Greene, PhD

Secure Transactions on the Internet
MARK N. GREENE, PhD
Vice President, Electronic Payments and Certification
IBM Corporation

IBM is a leader in developing technologies that enable secure transactions over the Internet. This session will discuss the company's secure payment system, an open set of technologies based on the Secure Electronic Transactions (SET) protocol. These offerings allow trusted electronic transmissions of credit card payments and communications on the Internet and other electronic networks. SET can be adapted to provide secure transactions on both public and private information networks.

Ed Koepfler

Strategic Advantage: Using the Intranet to Leverage Corporate Information Assets for the Enterprise
ED KOEPFLER
President and CEO
Interleaf, Inc.

Every corporation has a large intellectual asset: its mission-critical electronic documents. When maintained by an automated document management system and governed by corporate workflow processes, this critical information can be efficiently managed and easily leveraged as a corporate asset. The growth of the Internet has caused many companies to plan how this communications infrastructure can be utilized for corporate benefit or commercial gain. A key benefit of Internet technology is simple worldwide information access by different audiences. This session will use case studies to highlight the advantages of implementing secure document management systems for corporate business-critical documents and the advantages of using intranet technology to provide easy access to current information.

Thomas Tansy

Integrating and Managing Corporate Intranet Resources
THOMAS TANSY
Vice President of Sales and Marketing
NetCarta Corporation

The explosive growth of Web servers within the corporation demands new software solutions to manage Webs of information. Cyberspace cartography, or Web mapping, permits an integrated and unified approach to these ever-changing Webs of information, providing structure and visualization, making the information easier to access and more practical to oversee. Encompassing both server and client side elements, the single unifying approach saves time, resources and improves overall quality.

Joseph J. Chappell

Developing and Deploying Transaction-Based Business Applications On the Internet
JOSEPH J. CHAPPELL
Vice President, Enterprise Marketing
Progress Software Corporation

Many IS professionals have been asked to establish World Wide Web sites to increase their companies' market visibility. Some have gone beyond browsing capabilities and added dynamic information access to provide query capabilities for their Internet presence. The Internet provides an attractive solution for the development, distribution and maintainance of large-scale, transaction-based applications across a wide network of users. Internet deployment will enable corporations to extend the enterprise to reach a larger, more disparate group of users while reducing costs and complexity. This session will address emerging technologies for developing and deploying Internet-based business applications.

Defining Electronic Commerce
PAULA GEORGE TOMPKINS
CEO & Founder
SoftAd, Inc.

The definition of electronic commerce varies widely. Understanding its meaning is the subject of this session. You will learn whether electronic commerce will have an impact on your company's sales and marketing process, how electronic commerce will allow you to build alternative, low-cost sales channels, what kind of effect electronic commerce will have on your current sales distribution channels, who in your organization needs to be involved in getting your electronic commerce systems up and running, and when and how to use assisted and unassisted interactive selling techniques in your electronic commerce system.

Peter Kestenbaum

WANTED: Webmaster with 10 Years Experience
PETER KESTENBAUM
Director of Marketing, Northeast Area
Sun Microsystems, Inc.

Unfortunately, these people don't exist. This session will explore the various issues that keep webmasters up at night: how to make content decisions in a multi-faceted organization, how to maintain operational integrity and availability of your intranet, how to interface with your organization's reporting structure in marketing and corporate IS, and how to staff, recruit and train your operations staff. What should your optimal investment be in alternative sites? How do you measure the effectiveness of your Internet/intranet sites?

A Concurrent Session will also be presented by:
Silicon Graphics Computer Systems

CORPORATE HOSTS

BBN is a leading national provider of managed Internet access and value-added services for businesses and organizations. BBN Planet provides companies of all sizes with reliable Internet services, network security, web site development and hosting, system integration services and 24-hour-per-day monitoring. Through proven technical expertise and comprehensive services, BBN Planet helps customers make strategic business use of the Internet.

Cabletron Systems is the largest company in the world dedicated exclusively to computer networking products and services. With corporate headquarters in Rochester, NH, the company has more than 100 offices around the world and employs 5,700 people. Based on its Synthesis product framework, Cabletron develops, manufactures, markets and services both shared and switched-access internetworking products as well as the industry's most advanced network and systems management software. Over the last four quarters the company has reported record revenue of approximately $ 1 billion and earnings of $ 202 million.

Cisco Systems is the leading global provider of internetworking solutions, which give people access to information without regard to differences in time, place or type of computer system. Customers benefit from Cisco's internetworking solutions through more efficient exchange of information, which in turn leads to cost savings, process efficiencies and closer relationships with customers, business partners and employees. Cisco solutions are the internetworking foundation of thousands of companies worldwide, and Cisco is a driving force behind the global Internet. More than 80 percent of the backbone routers of the Internet are from Cisco, and Cisco is one of the best examples of a company that does business on the Internet, as it provides more than 70 percent of its customer support over the Internet.

Compaq Computer Corporation is the world's largest supplier of personal computers, offering desktop PCs, portable PCs, servers and options. The company reported 1995 worldwide sales of $14.8 billion. Compaq products are sold and supported in more than 100 countries through Compaq marketing partners and sold directly to customers through Compaq Direct Plus at 1-800-888-5858. Compaq provides 24-hour customer support and can be reached through the Compaq forums on America Online, CompuServe, Internet (http://www.compaq.com), and Prodigy, or by calling 1-800-OK-COMPAQ. Product information and reseller locations can be obtained by calling 1-800-345-1518.

Computer Associates International, Inc. is the leading independent software company in the world. CA develops, markets and supports integrated systems management, information and business-applications software for a broad range of mainframe, midrange and desktop computers. CA serves the international marketplace through direct operations in 29 countries.

Connect, Inc. is the leading provider of Internet-based interactive commerce and order management applications for companies that want to leverage the Internet as a new sales channel. The company develops market leading interactive commerce applications including OneServer™ and OneServer OrderStream™. OneServer is the industry's most robust, open and scalable applications platform for high-end interactive commerce. OneServer OrderStream is the first Internet-based order management application to create a Virtual Sales Channel™ for business-to-business transactions.

Founded in 1989, **Gradient Technologies** has long been an active supporter of open systems standards organizations and is a member of the Open Software Foundation, the Object Management Group, and X/Open. Gradient's licensing software has been selected by the Open Software Foundation for inclusion in its reference port of the OSF's Distributed Management Environment. Gradient's joint submission with IBM and Digital Equipment Corporation for object licensing was recently selected by the Object Management Group as its object licensing standard and Gradient's DCE product line has been based on the OSF Distributed Computing Environment since its inception. Gradient is privately held and based in Marlborough, Massachusetts with worldwide operations and distribution.

Hewlett-Packard Company is a leading global manufacturer of computing, communications and measurement products and services recognized for excellence in quality and support. HP is the second largest computer supplier in the United States, with revenue in excess of $31 billion in its 1995 fiscal year and 102,300 employees worldwide. HP has a strong history of leadership in open systems and in the development of standards-based products. This standards-based strategy enables customers to select the best available computer products from HP and other vendors and link them into open, cooperative networks that make information easier to acquire, share, manage and use.

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IBM Corporation is the world's largest manufacturer of information systems for business, the home and the Internet. It is also the world's largest software producer. Based in the United States, IBM does business in virtually every country in the world. In each of these markets, it is regarded as one of the leading corporations. IBM designs, develops, manufactures and distributes information technology solutions that include everything from sub-notebook size personal computers to the largest supercomputers. The hardware solutions are enhanced through IBM's comprehensive software, customer service and maintenance offerings. One of the founding developers of the Internet, IBM offers easy and comprehensive solutions to help people get connected to the Internet and take full advantage of its tremendous resources.

Interleaf, Inc., is the leading worldwide supplier of integrated document management software, services and tools for networked and Web-based business solutions. The Intellecte family of knowledge management products is advanced, open software for the electronic assembly, management, retrieval, distribution and publishing of business-critical information. Interleaf is headquartered in Waltham, Mass., with offices around the world and over one million users worldwide. Information about Interleaf's products is available on the World Wide Web at http://www.interleaf.com or from Interleaf Direct at 1 (800) 955-5323.

NetCarta Corporation is the leading provider of World Wide Web mapping solutions. Web mapping is a technology used to structure, visualize, and manage hyper text-linked webs of information. Information webs of this type include the Internet-based World Wide Web and those found in the information systems of large businesses. Applications of web mapping include web management, advanced navigation, site analysis, structure-based search and retrieval, and concept-based NetCarta WebMap™ publishing. The goal of NetCarta is to make information webs easier to access and more practical to oversee.

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Silicon Graphics is the leading supplier of high-performance visual computing systems. The company has defined new classes of visual computing and transformed them into practical, cost-effective solutions. The company, founded in 1982, employs approximately 7,200 people in 65 domestic and 65 international locations. Silicon Graphics is recognized as the third-largest workstation vendor and the fourth-largest supercomputer vendor in the world. Listed on the New York Stock Exchange under the symbol SGI, Silicon Graphics derives approximately 50 percent of its revenues from sales outside North America.

SoftAd is a pioneer and leader in the development of software components that allow corporations to conduct electronic commerce. SoftAd's SalesExcelerator™ and WebExcelerator™ products allow the buying and selling of goods and services through technology based on line trade. These products also allow a company to open new sales distribution channels and customer transaction models (Assisted and Unassisted interactive selling) through computer technology. SoftAd's WWW address is http://www.softadgroup.com.

Described as the "King of the Internet" by Business Week magazine, **Sun Microsystems, Inc.** is the premiere provider of open systems and solutions for the enterprise and Internet. Among the Internet and networking technologies developed at Sun are: NFS, the open standard for file sharing across networks; Java, the first programming language to provide a comprehensive solution to the challenges of delivering applications across public networks such as the Internet; HotJava, an interactive, multimedia Internet web browser; Netra, a "plug and play" solution for Internet connectivity to PC-LANs; and SunScreen, a sophisticated network security solution. Sun, a Fortune 120 company, was founded in 1992 and has annual revenues of $6 billion and 14,000 employees worldwide. Sun Microsystems is headquartered in Mountain View, California.

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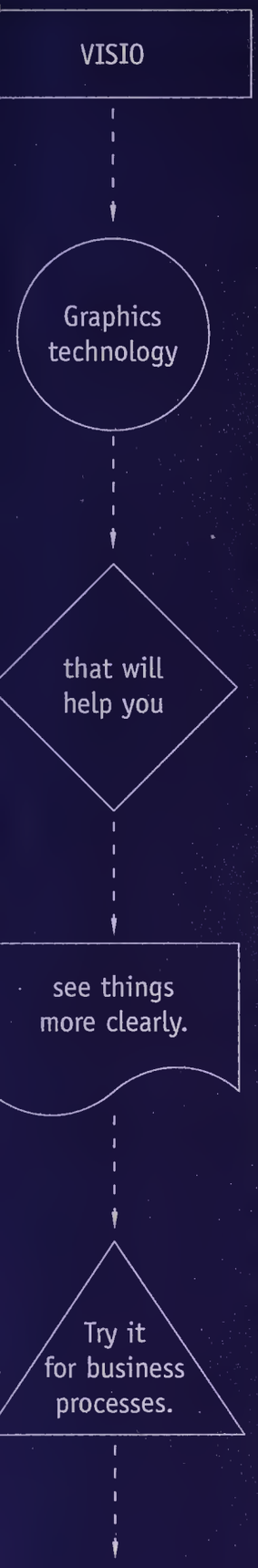

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Rethinking

■ AS THE PUBLIC SECTOR'S "DEVOLUTION REVOLUTION" GETS UNDERWAY, U.S. GOVERNMENT—AT EVERY LEVEL—WILL FOCUS ON HOW I.T. CAN HELP MAKE IT RUN BETTER AND COST LESS

BY MICKEY WILLIAMSON

Much of the talk in congressional halls these days is of delegating responsibility for control of social programs to the states. This shift will heighten the pressure for efficient management of information at the federal, state, and local levels of government. Meanwhile, economic constraints and a long history of systems development failures have caused legislators to take an increasingly jaundiced look at requests for huge technology acquisitions.

To deal with this dichotomy, Congress in 1995 enacted comprehensive reform of information technology management. Among other measures, the Information Technology Management Reform Act, more commonly known as the Cohen Act (named after its chief sponsor, Sen. William Cohen, R-Maine), requires that every major federal agency appoint its own CIO. Inspired in part by this increased demand for IT excellence, states and even local governments are looking for ways to improve their information management capacity. To learn more about this tumult in information resource management and what it means to businesses and individuals, *CIO* assembled a panel of experts for a roundtable discussion.

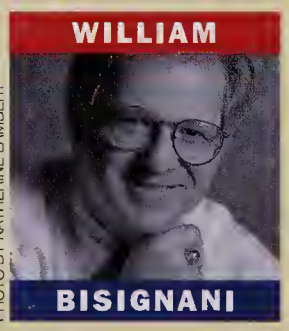

PHOTO BY KATHERINE LAMBERT

PhD, director of state, local and international information systems at Mitretek Systems Inc. in McLean, Va., a nonprofit corporation that works with governments at all levels on IT-based development projects

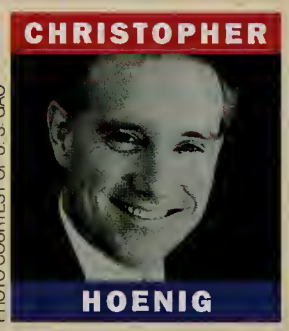

PHOTO COURTESY OF U.S. GAO

Director of information management issues at the U.S. General Accounting Office and leader of efforts to identify valuable private sector and state practices in information management and process reengineering

the Way Government Works

CIO: *The Cohen Act calls for major changes in the way the federal government manages information technology. What is prompting that kind of legislation, and what kinds of changes can we expect?*

CHRISTOPHER HOENIG: The legislation is a reflection of the desire, in the words of Vice President Al Gore, for a government that is smaller, works better and costs less. The changes that come with it are going to place a significantly improved focus on important IT issues.

Until now, the people with IT responsibilities in most federal agencies have typically been buried two or three levels down in the organization. The new legislation establishes the position of CIO for 24 federal departments and agencies, and many subagencies will be able to create CIO positions as well. Beginning August 8, 1996, when the law goes into effect, every major federal agency will have a CIO whose primary responsibility is to manage information resources.

In addition, for the first time ever, we'll be applying at the federal level those best practices that have been proven already in the private sector: capital investment planning, benchmarking, process reengineering, more-flexible procurement procedures and performance measurement. More attention will be paid to interagency issues, including infrastructure and information technology standards and the integration of federal, state and local approaches to service delivery.

At appropriations time here in Washington, we will demand a much tighter link between dollars spent and results produced. Agencies that ask Congress to authorize huge expenditures for technology will be required to show quantifiable and independently verifiable results afterward.

But the stakes are high. We spend three cents out of every federal dollar on comput-

PHOTO BY ROBERT BURKE

PhD, assistant professor in the Department of Information Systems at the University of Maryland in Baltimore County and co-principal investigator of a national study of innovation in information management and use in municipal government

PHOTO BY DOUGLAS ELBINGER

CIO for the state of Michigan and deputy director for procurement and information technology of the state's Department of Management and Budget

DID YOU KNOW...

THE BIG SQUEEZE

Congress expects each executive agency to reduce its costs for operating and maintaining IT by 5 percent each year.

SOURCE: THE INFORMATION TECHNOLOGY MANAGEMENT REFORM (COHEN) ACT OF 1996, TITLE III

ers and telecommunications. If we do it well and get good returns, we can demonstrate the legitimacy and the value of government to the public. If we do it poorly, even if we end up with scattered successes, we risk even more waste and a decline in government's legitimacy.

JOHN KOST: The federal government will be bringing in CIOs who won't be allowed to focus just on technology but will have to understand how technology applies to the business of the agency. An increasing number of states are also establishing the position of statewide CIO, in some cases at the cabinet level. It is an essential role. Elected public policy-makers typically aren't well-versed in technology. They need someone who can interpret the relationship between policy and technology for them.

WILLIAM BISIGNANI: In general, a great deal of responsibility is going to devolve to the states and municipalities, no matter what Congress decides to do about block grant programs. As the so-called "devolution revolution" shifts responsibility from the federal to the state and local governments, it will also put considerable pressure on all those governments to change the way they do business.

PATRICIA FLETCHER: The growth in end-user computing is also having an effect. There was a time when state and local governments were asked *when* they planned to automate. Now everybody is automated. Computing has become widespread in governments, and the people who work for cities and counties are excited about the technology. They're no longer willing to wait around for something to happen within their governments. Instead, they're exploring different ways to provide services to their constituent groups. That's a major change from how things used to happen.

HOENIG: The private sector has been operating in a globally competitive marketplace for 10 or 15 years now, and that intensity has been increasing every year. The government sector has been slowly absorbing that sense of urgency, but it is probably the last one to get it.

Competitiveness, the mobility of capital and the increasing attention to getting good returns on scarce capital are the really big reasons behind this new emphasis on information technology. Government has to be able to deliver value. If you're out of work because your organization has downsized in order to increase its return on assets, you'll probably be sensitive to the fact that you're paying taxes to a government that's not accountable to you. Or you may notice that you pay taxes to the IRS, which, ironically, has difficulty producing its own audited financial statement though it expects you to produce yours.

CIO: *How will industry and taxpayers be affected if governments make their IT organizations more accountable?*

HOENIG: The good news for companies that do business with the federal government is that there's going to be much more flexibility in procurement and other aspects of the industry-government agency relationship. The bad news is that, in return for a less formal relationship, there's going to be an increasing demand for real performance and for very high levels of value delivered for money spent.

For the public, I think it's almost all good news. Ultimately, taxpayers should not only be able to know what they're getting for the dollars spent on IT investments, but they also should be getting better service, such as a single point of contact for problem resolution.

CIO: *How will governments be affected?*

FLETCHER: At the local level, governments will have to become much more responsive to businesses and citizens in their community. I'm already beginning to see this in the area of licenses and permits, where, for example, building contractors no longer have to undergo long delays to get information on local regulations or obtain licenses and permits. That's just one instance where, as a result of reengineering government activities, some cities and counties are becoming much more attractive places to do business. And communities that can use information technology to attract businesses are better able to build their tax bases.

CIO: *Are there any models to show the government how to conduct its business differently?*

KOST: One example of a new way of doing government business is the Electronic Benefits Transfer [EBT] program. It goes beyond automatic funds transfer; it's more like a debit card system. Under the program—instead of paying for a purchase with food stamps—clients present a debit card, and the amount of the purchase is withdrawn as cash from their accounts and credited to the respective ven-

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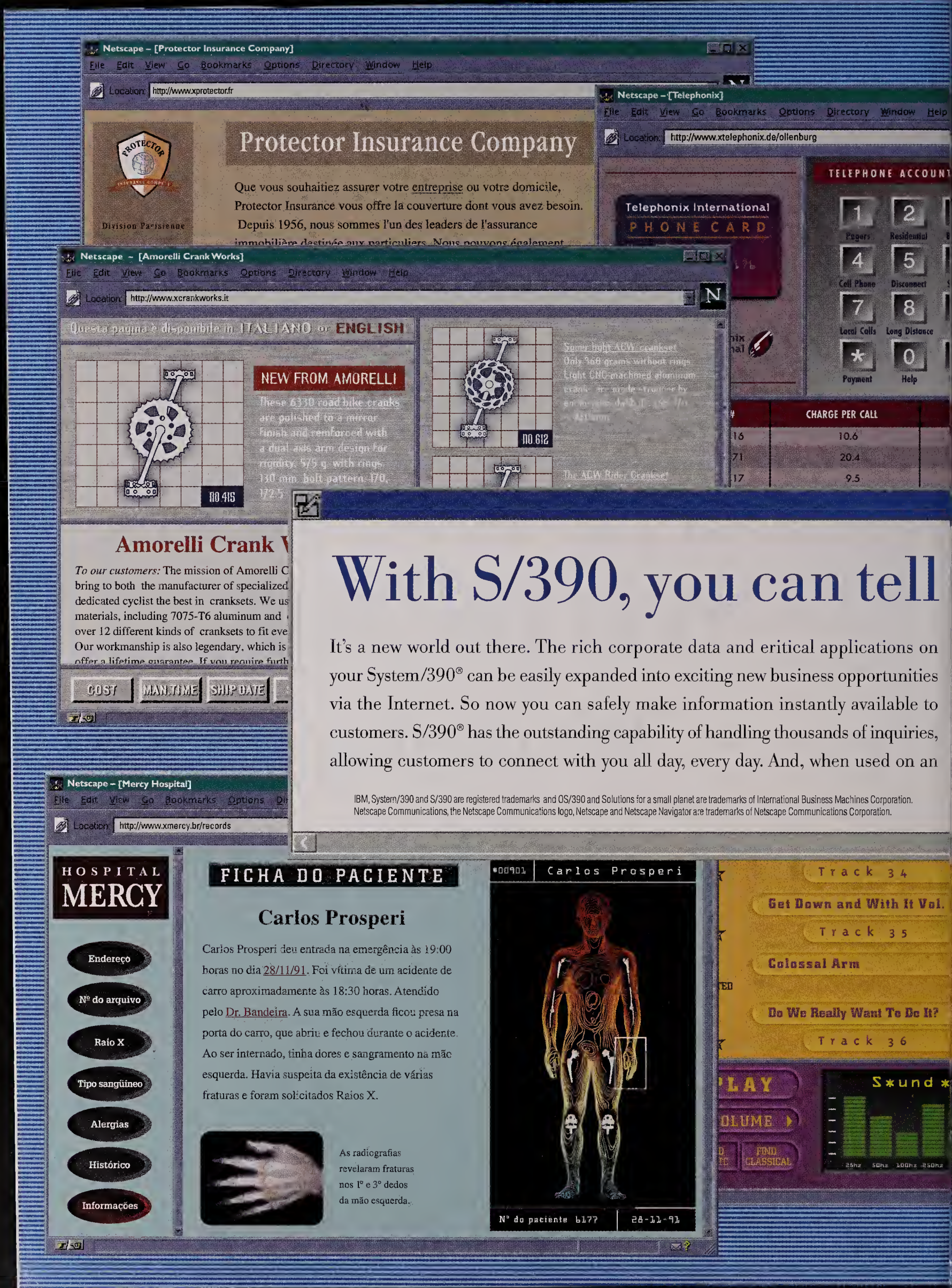
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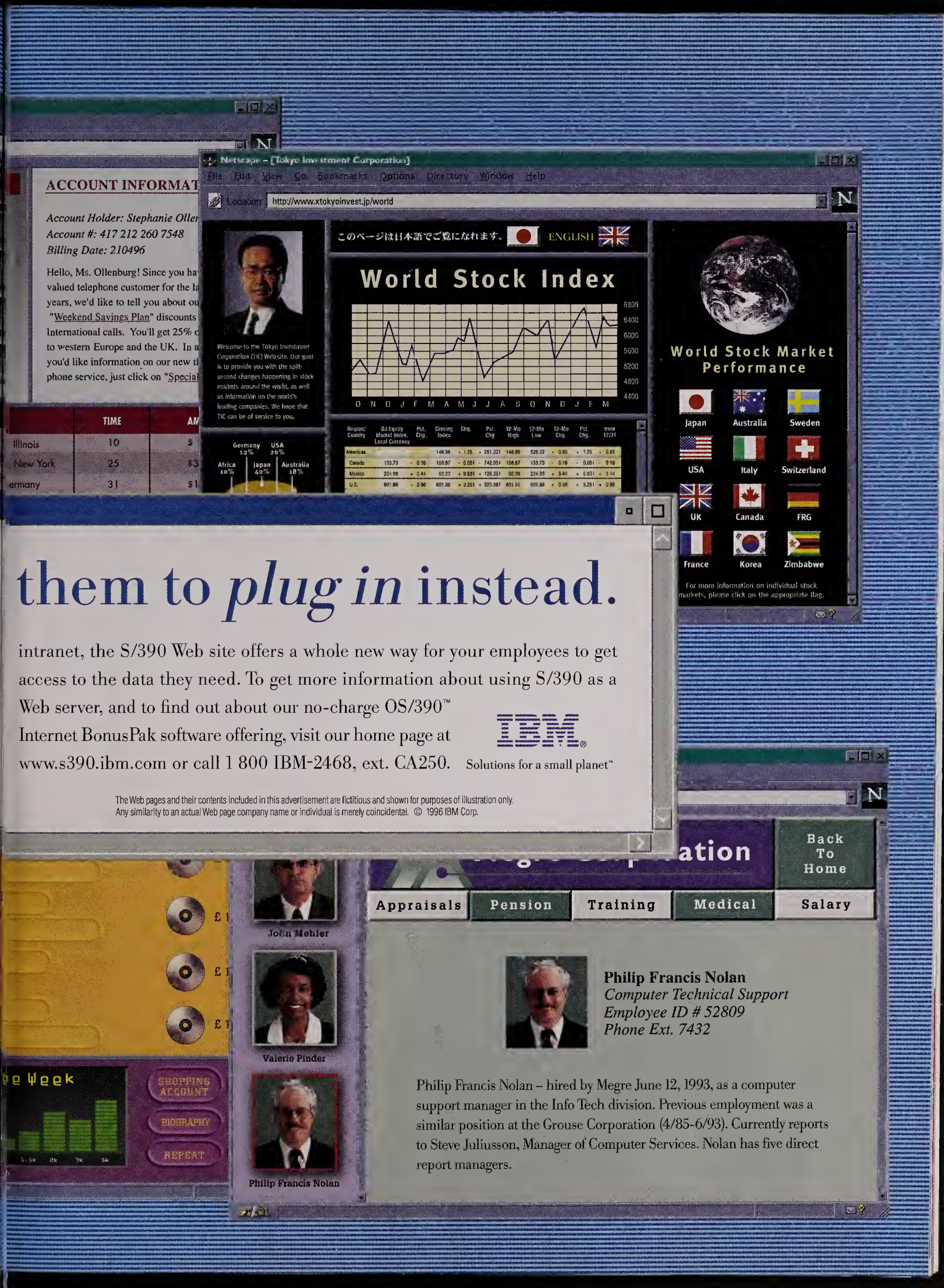
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DID YOU KNOW...

MILLENNIUM MIRE

As of April 1996, 30 U.S. states had begun a statewide year 2000 conversion program.

SOURCE: NATIONAL ASSOCIATION OF STATE INFORMATION RESOURCE EXECUTIVES (NASIRE)

dor's account. The EBT program will spin off a variety of other programs as well: For example, it will act as a depository account for many public assistance-type programs, all of which can be debited by the appropriate vendor at the point of sale or service. So far, only Maryland and Texas are using the EBT program, and Michigan is about to start, but the federal EBT Task Force hopes to see every state enrolled eventually.

BISIGNANI: Another model consists of establishing partnerships between government and industry to achieve a specific goal. The state of Maryland has developed a partnership arrangement called the Unemployment Insurance Information Technology Support Center. In addition to the state unemployment office, it includes the U.S. Department of Labor, Mitretek Systems, Lockheed Martin and the University of Maryland. Those organizations are working to develop somewhat standardized IT capabilities for the state unemployment insurance operations. And although no state is actually required to use the results of the more than 20 projects that are now underway, I believe many will.

Also, the governors from some western states are trying to identify opportunities for coordinating state procurements and for sharing IT development costs of infrastructures and applications. They are prepared to act as anchor tenants on the infrastructure, just as a major retail chain acts as the anchor tenant for a shopping mall. Once you have an organization that's willing to make the initial investment in an infrastructure, there is the tendency for others to come on-board.

The right partnership arrangement can, indeed, provide an effective global solution where each player brings something to the table. They could bring funding. They could bring talent. They could bring something else. I think those kinds of partnerships are going to become increasingly more valuable.

CIO: *Are any of those innovations filtering down to IT shops in local government?*

FLETCHER: Not at the local level, where I've done most of my research in the last eight years. The federal legislation requiring agencies to have CIOs is very encouraging, but best practices and performance measures are not in place in most county and city governments. That doesn't mean they aren't using technology in innovative ways, but we don't see measurement, tracking and evaluation in place at all; nor do we see a general trend in that direction at this point.

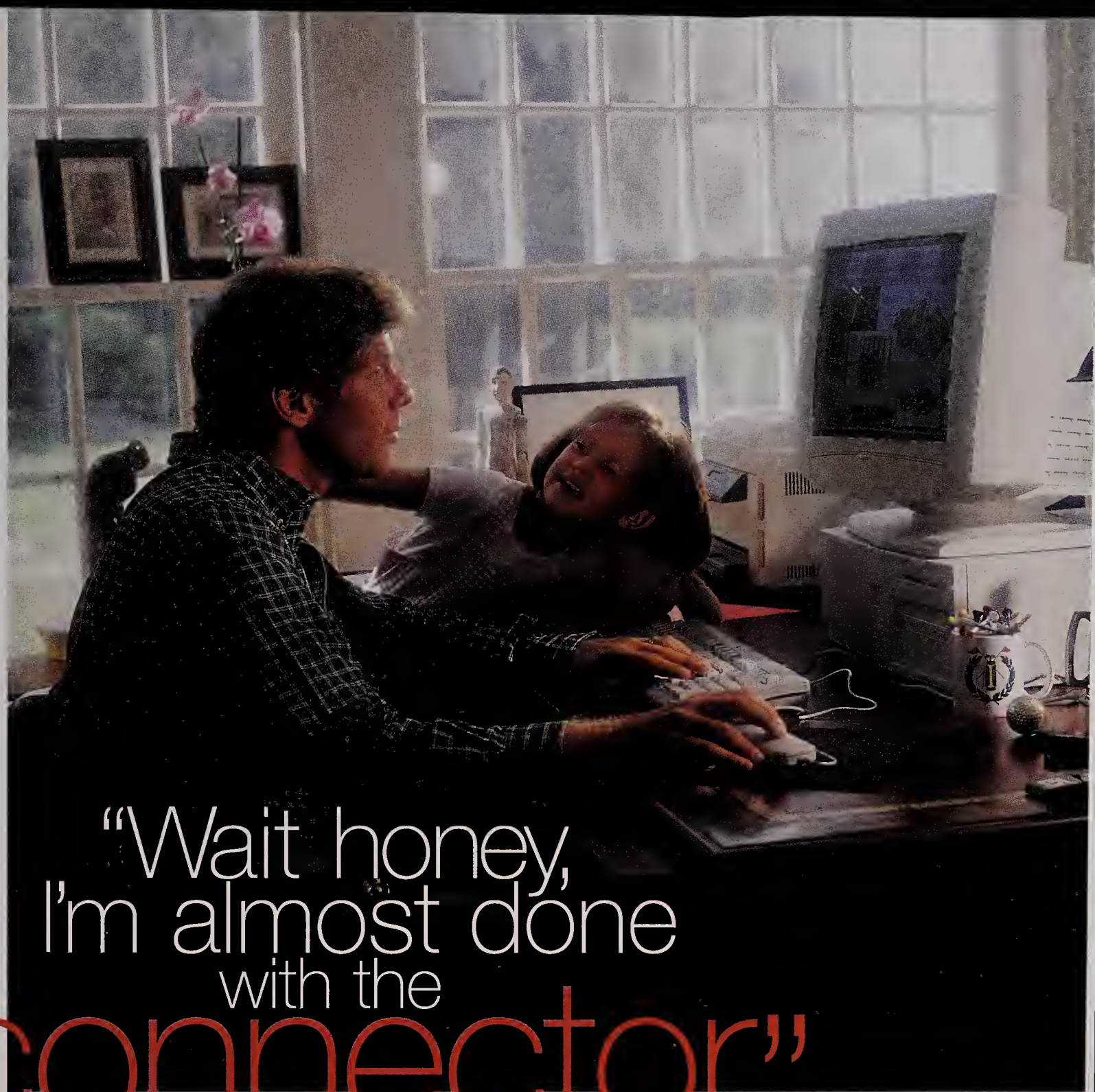
However, I have found three CIOs in cities—in Philadelphia, San Diego and Boston—and in those instances, the office of information technology is directly accountable to the mayor's office. Another interesting fact is that all three CIOs came from the private sector, and they brought with them a lot of private sector ideas, allowing them to look at those cities with a more businesslike focus.

CIO: *A loosening of procurement procedures is among the provisions of the Cohen Act. How significant is that as a factor in information technology management?*

FLETCHER: In our study of cities, we found that procurement was pretty much responsible for inhibiting innovation because it hampered quick response. Now many cities are doing business-process reengineering [BPR] in procurement. Typically, the procurement process is where they start their BPR efforts, in order to cut the time it takes to acquire hardware and software. In Philadelphia, they are cutting months out of what was a very tedious, stultifying process.

JOHN KOST: *"When we started our flexible procurement process in Michigan, we benchmarked ourselves to see how other states compared. Then we decided, 'Forget the other states. Let's look at companies that have won awards for their procurement systems.'"*

PHOTO BY DOUGLAS ELBINGER



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SOURCE: BOARD OF TRUSTEES' 1995 ANNUAL REPORTS OF THE SOCIAL SECURITY AND MEDICAL TRUST FUNDS

KOST: To be effective, the CIO needs to have control over what he or she buys. Many old procurement rules stifle innovation and preclude keeping up with the very rapid pace of change. Cities that are becoming automated under the old competitive bidding procurement rules have a problem because what they're buying will be outdated by the time they get through the bidding process.

One way to avoid that is exemplified by what we've done in Michigan: We have a very flexible procurement process that I would put up against many of the best corporations in the world. We looked at our state law and discovered that we had all kinds of flexibility. The law says, "You shall use competitive bidding...except when another procurement method is in the state's best interest." So we don't competitively bid on everything; we look out for the best interests of the state. We consider how we can get where we want to be as efficiently and fairly as possibly. Fairness is for the taxpayers, not the bidders or the vendors. Process be damned. The basic issue is how we make government better.

CIO: *How does the private sector practice of benchmarking apply to the public sector?*

BISIGNANI: Benchmarking—comparing yourself with others and coming up with efficient measures of success and failure—is extremely important. Measurement, like training, normally falls to the bottom of people's to-do lists. They don't take the time to gather information and analyze it. To make these measures successful, we have to build in as much real-time automated measurement capability as possible and smarten up our systems. That's one way to make IT more efficient.

HOENIG: I agree. The idea of benchmarking is to be applauded. It's a very simple thing to do, but it's a very powerful approach. I have found consistently that the leading organizations and the leading executives are ones that go out and aggressively learn from each other.

KOST: When we started our flexible procurement process in Michigan, we benchmarked ourselves to see how other states compared. Then we decided, "Forget the other states. Let's look at Ford and Hewlett-Packard—companies that have won awards for their procurement systems."

CIO: *Will Michigan try to institute some of the changes you've described—the CIO approach, changes in procurement practices, for example—at the local level as well? Will cities and counties have incentives to follow your model?*

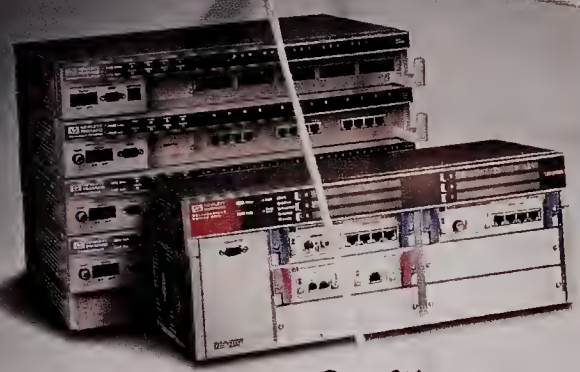
KOST: We aren't pushing anything. We are setting an example, but we are also making many of our services available to the localities. In one instance, a couple of agencies wanted to create a registry of children who have been immunized. In the past, an agency would buy a big mainframe and require that all the state, county and local health departments send in their data, but nobody could get at the information. Our approach now is to use a client/server network, put the information in a relational database and let everyone have access to it. Then it has value to everybody, and no one has to be forced to use it.

CIO: *Are there other advantages that can be distributed back to smaller agencies?*

KOST: We let everyone buy off our outsourced desktop technology contract. Because we are a large buyer, we have enormous buying power. Our prices are actually better than the federal GSA schedules. We're also building a statewide 800MHz radio system. It was originally for the state police, but now we are making it available at $250 plus the cost of the radio to every local law enforcement official in the state. We're not making a profit. We're giving it to them at cost. Increasingly, people in local govern-

PATRICIA FLETCHER: *"Some cities and counties are becoming much more attractive places to do business. And communities that can use IT to attract businesses are better able to build their tax bases."*

PHOTO BY ROBERT BURKE



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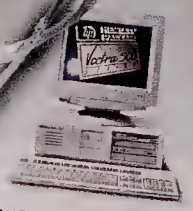

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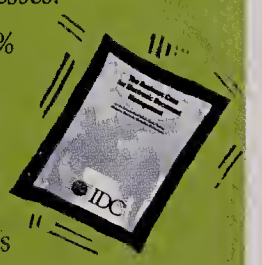

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SOURCE: G2 RESEARCH INC., MOUNTAIN VIEW, CALIF.

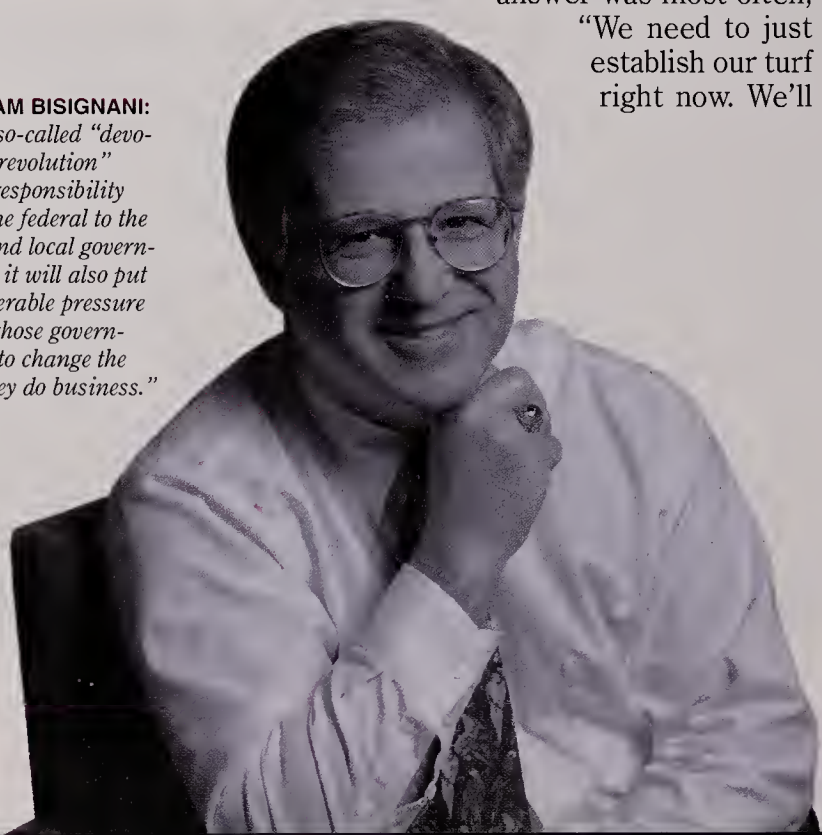
ment in Michigan are becoming true believers and taking advantage of the services we offer.

CIO: *How will government make use of the Internet? Is anyone really taking advantage of its capabilities?*

BISIGNANI: In certain applications, I'm seeing a tremendous increase in sharing information. To use the Unemployment Insurance Information Technology Support Center as an example, information on unemployment, not only within the United States but also from other countries, is flowing back and forth at a rapidly increasing rate. Perhaps the Internet could serve as a factor in pulling that particular community together.

KOST: I think the Internet will have some fundamental effects on what kinds of infrastructures we invest in over time. But right now, I see the Internet as an information source as opposed to a service source. There are a few places where it is used to provide service, but we've got a long way to go before that becomes commonplace.

FLETCHER: At the city and county level at this point, I don't see any indication that it is being used in a service capacity. Over the past eight months, I have seen many cities jump onto the World Wide Web with home pages. When I asked IT people why they were doing that and whether they had any real plans, the answer was most often, "We need to just establish our turf right now. We'll evaluate what we'll do with it later; but, for now, it's a low-cost way to get information out."



WILLIAM BISIGNANI: *"As the so-called "devolution revolution" shifts responsibility from the federal to the state and local governments, it will also put considerable pressure on all those governments to change the way they do business."*

CIO: *How optimistic are you that the entrepreneurial spirit that led to the creation of the CIO posts at the federal level will survive—that the CIOs are, in fact, going to be full players in the operation of government and that they are not going to be paralyzed by rigid procurement rules and cultural inflexibility?*

HOENIG: The federal government changes slowly. Change is going to come on a three- to five-year time scale. You'll see some small changes in the first year or two of implementation. Then it's going to grow. I've had five years now in the federal government, after having spent most of my time in the private sector. I think I have a reasonable sense of how fast things change. I'd have to say that I'm pretty optimistic about the prospect for change.

CIO: *How is this legislation different from the initiative back in the 1980s for information resource management [IRM] and IRM managers?*

FLETCHER: That generated an awful lot of excitement, a sense of information technology becoming professional, having a high level of accountability and visibility. And yet none of that really has happened with the IRM legislation.

HOENIG: I see three factors: carrots, sticks and people. There is a growing incentive—a carrot—for agencies to use their dollars more wisely. They get fewer of them, and spending on IT is getting greater scrutiny. There's also the stick—Congress's patience is wearing increasingly thin, and major systems development efforts are just being canceled or dramatically scaled back because Congress is not willing to just hand over the money. And the people—well, there's a very robust professional practice network that is growing right now.

Career employees, and even some political professionals, are genuinely trying to institutionalize different ways to do business. So for those reasons, I am optimistic. But we are trying to tame a very large beast—the federal government. And it's going to change very slowly. CIO

Contributing Writer Mickey Williamson can be reached at mwilliamson@reporters.net.

PHOTO BY KATHERINE LAMBERT

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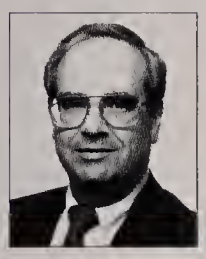

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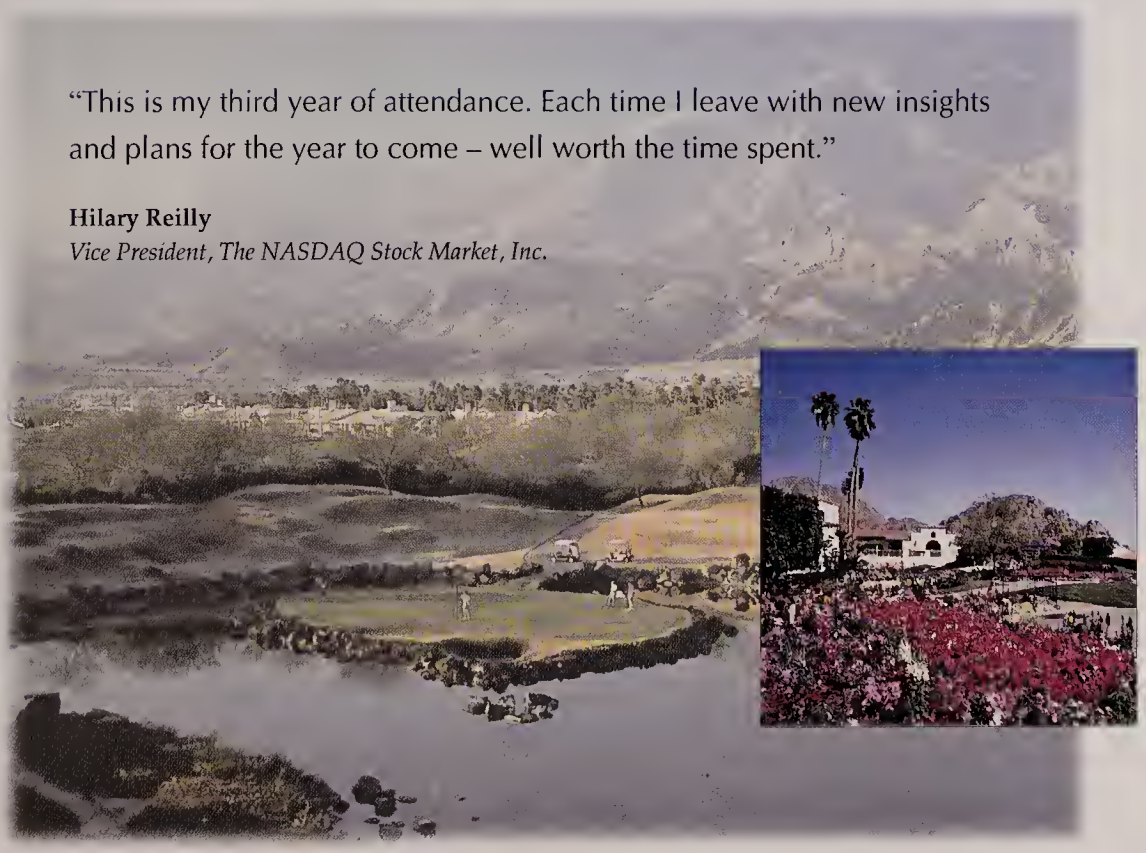

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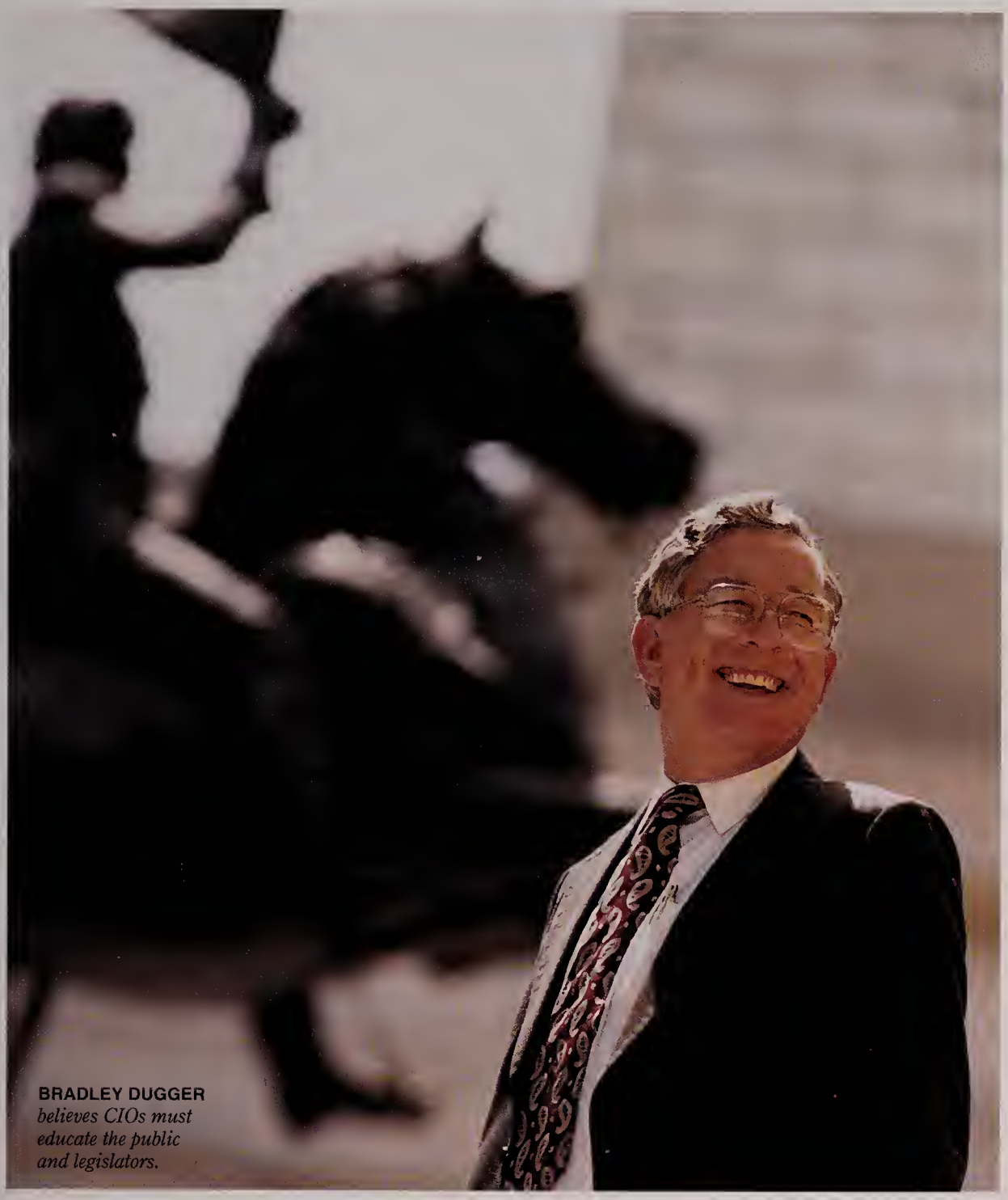
BY PETER FABRIS



BRADLEY DUGGER *believes CIOs must educate the public and legislators.*

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With the national debt soaring to incomprehensible levels, politicians of all political stripes advocate slashing spending. Governments increasingly look to IT to stretch tax dollars and improve services. For instance, there is a grassroots movement to coordinate and reinvent government at all levels so that citizens will be able to interact with local, county, state and federal agencies seamlessly—a one-stop shopping model. Such goals require the skilled application of sophisticated computer networks, databases and interfaces such as public information kiosks. CIOs, as IT strategists and project planners, are major players in this transformation. No longer relegated to managing back-room data processing centers, some public sector CIOs help draft legislation and set government policy.

PHOTO LEFT BY KATHERINE LAMBERT; PHOTO RIGHT BY BOB SCHATZ

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CUTTING REMARKS

"It is mind-boggling to realize that, as of Feb. 20, 1996, our country's liquid assets...totaled $5.616 trillion. The national debt totaled $4.988 trillion as of last October. Raising taxes will treat the symptoms but make the disease worse. Spending simply must be cut—not just this year but also next year and for many years to come."

–MARILYN VOS SAVANT, "ASK MARILYN," *PARADE* (MARCH 17, 1996)

State and federal governments alike have institutionalized the CIO position in recent years, and cities are following suit. The Information Technology Management Reform Act, more generally known as the Cohen Act (named after its chief sponsor, Sen. William Cohen), a far-reaching initiative that will transform federal IT management, takes effect in August. It requires 24 major federal agencies to appoint a CIO and encourages the appointment of a deputy CIO, validating, in effect, the CIO position in government. The Cohen Act states that federal CIOs will report directly to agency directors, giving them significant clout, at least on paper. "The CIO has to be at the table when decisions are made regarding capital expenditures," says Bruce McConnell, chief of the information policy and technology division of the Office of Information and Regulatory Affairs, a division of the Office of Management and Budget. McConnell adds that a CIO in the public sector is expected to ask questions such as, "Should the agency be performing this function or could it be performed better by someone in the private sector? Can we outsource to another agency? Has the process been evaluated so that we know we are performing it efficiently?" In other words, McConnell says, the CIO should be "a pain in the neck" during capital investment and strategic planning discussions, making sure technology projects are planned wisely.

BRADLEY DUGGER: *"In the private sector, failures don't get as much press."*

PHOTO BY BOB SCHATZ

The IS executive in the government office formerly charged with technology oversight of all major federal agencies, excluding the Department of Defense, welcomes these changes. Joe M. Thompson, CIO of the General Services Administration, was in an agency responsible for annually policing about $25 billion worth of technology projects. Now his primary responsibility is to plan strategy and technology investments with the GSA. "I like to refer to the position as chief investment officer," he says. With enactment of the Cohen Act, CIOs in the other agencies shoulder responsibility for overseeing their own agencies' IT projects. "Twenty-four people can do that job better than one," Thompson says. The Federal CIO Working Group, composed of CIOs from each agency and headed by Thompson, has provided a forum for refining the duties of the position and for sharing best practices and information among agencies. In August, that body will disband and the Federal CIO Council will take its place. Federal CIOs must make a strong business case for IT spending from now on, says Thompson. "If you don't make a good case, you don't get the money. If you don't stay on schedule, you don't get to keep the money. The act requires CIOs to get measurable [business] results."

That more businesslike attitude is already present in other levels of government. Many states have had IS executive strategists for several years, and a few cities—notably New York and Philadelphia—have done likewise. What makes for a good business case in government where profits are not the common goal? Cutting costs, naturally, makes for a strong argument. California spends an estimated $25 million a year to process payroll and benefits checks, says John Thomas Flynn, the state's new CIO. He points out that switching to electronic transfers could save a significant chunk of those expenditures.

With no competitors to fend off, governments haven't been too concerned with improving customer service except around election time. That attitude is changing, however, partially because citizens are used to high standards from the private sector and expect governments to keep pace. One mea-

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surement of customer service is time. "People's time in this economy is very precious," says Ralph Balzano, commissioner of the Department of Information Technology and Telecommunications and CIO for New York. Balzano adds that progressive governments recognize that fact. For some New York residents, particularly those from Staten Island and the Northeast Bronx, commuting to City Hall in Manhattan is not an easy proposition.

ADVICE FOR GOVERNMENT CIOs

For those new to the CIO position in the public sector, the job can seem overwhelming. Here's some veterans' advice:

Vice president and CIO of Systems Research and Applications Corp. of Arlington, Va., and a former deputy commissioner for systems with the Social Security Administration

Pay close attention to capital planning. Evaluate alternatives: There's more than one way to build a project. Think about what you're doing in deployable increments. You're better off getting capability in six-month segments rather than in two- to four-year projects.

CIO of the General Services Administration

You must be a visionary and share your vision with your staff and agency director. When implementing changes in a government organization, you must explain to all parties what is in it for them. Changes are happening fast, so you can't expect everybody to be on board in the beginning.

Commissioner of the Department of Information Technology and Telecommunications and CIO for New York

You're going to be surprised that there's plenty of drive and talent in people working in government. Direction from above is often missing, however. To remedy that, it's important to show how important each person's work is to the big picture. In addition to knowing your way around telecommunications and IT, you need to take Politics 101. CIOs have to be fair to both sides of the aisle and do some juggling to remain neutral.

Chief of information systems for the state of Tennessee

Attracting high-quality employees can be difficult because governments pay less than the private sector. But a lot of times we use the lack of high pay as an excuse. Accentuate the positive when recruiting. IT is a hugely important part of the government environment. The work is meaningful, and there are tons of promotional and growth opportunities.

–P. Fabris

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[2] *International Data Corporation "The Unix Systems Market," September, 1995.*

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CALL OFF THE SEARCH

IT in this branch of the armed services is no longer adrift

The U.S. Coast Guard has found its man. The first-ever CIO for the smallest branch of the armed services was found in Alameda, Calif. John Tozzi, a Coast Guard rear admiral who had been heading an interagency drug task force on the West Coast, will report to Washington at the end of this month to assume the new post of director of information and technology. Tozzi's appointment is the culmination of an effort that began five years ago when a fault-finding audit by the General Accounting Office resulted in a freezing of the Coast Guard's information technology budget. Since then, the Coast Guard has battled to gain control over its information resource management practices, including drafting a comprehensive charter for a CIO position (see "Search and Rescue," *CIO*, Dec. 1, 1995).

Tozzi, trained as an engineer, is grateful for the advance planning but says he finds the concept a thorny one. "I've been reading a lot of the magazines to try to get a handle on what CIOs do. I read the stuff that says what they should do; everybody has an opinion. But I'm not convinced anybody knows how to do

COVER STORY: THE CIO'S ROLE

CIO Search and Rescue

The Coast Guard didn't use a CIO to rescue it from troubled IS waters. Now that it's in calmer seas, however, it's looking for a captain to chart a smoother course for the future.

BY RICHARD PASTORE

Too many CIO positions, it seems, are created as acts of desperation. Information management maladies infect an organization; then, like reeling victims dialing 911, the companies call in CIOs to rescue them from their systemic ailments.

But that isn't the case at the U.S. Coast Guard. The smallest of the armed services has diagnosed, triaged and begun resuscitation of its IS management without a CIO. In doing so, it hopes to pave the way for the CIO it expects to bring on board within the year.

The approach is somewhat unusual, according to observers. More typically, a CIO is hired to develop the turnaround plan and is required to take full ownership of it from the unenviable position of new kid on the block. Sometimes a consultant may make recommendations that include a strategic plan and provisions for its leadership. But the Coast

Enabling residents to conduct transactions with the city from their homes or neighborhoods will save them a lot of time and frustration. With that goal in mind, New York beefed up its telecommunications infrastructure to provide citizen access to the Internet and to prepare for a network of interactive kiosks throughout the city.

In the past, IS performance in government was focused on technical milestones: How fast can we deploy a new network of workstations? How much have we increased processing speed and power? The new, businesslike mind-set has changed the criteria for public sector IS success, says Renny DiPentima, Fairfax, Va.-based vice president and CIO of Systems Research and Applications Corp. of Arlington, Va., and a former deputy commissioner for systems with the Social Security Administration. "Now the questions have changed: Are people waiting in line in an office for 15 minutes instead of 30? Are we answering the phone faster so there are fewer busy signals?"

Residents who spend less time in lines or being stranded on hold will experience the benefits of technology firsthand. In time, the contributions of CIOs will become apparent to all. Still, to the public and many lawmakers today, the title "CIO" may elicit puzzlement. To change that, many public sector IS managers believe they must lobby more aggressively and inform constituents about what a CIO does and what technology can accom-

IS honchos in government are almost universal in their enthusiasm for their work. The potential for making a difference in the quality of life is greater than in any private sector organization.

DID YOU KNOW...

NETWORK 911

The Change Management and Help Facility Services Unit of New York's IT department responds to more than 125,000 data communications network problem calls annually.

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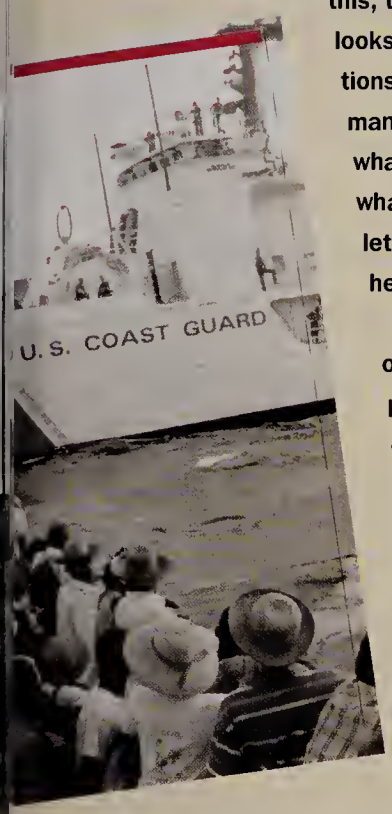

this, to tell you the truth," he says. "It looks to me like a lot of these CIO positions are born of frustration from top management who don't necessarily know what they want done but certainly know what's not getting done. They say, 'Hey, let's get somebody to do whatever the hell it is we need.'"

Rather than being tapped to figure out what's wrong and fill some vaguely perceived gaps, Tozzi has a broad but clear mission: In a time of organizational streamlining, he must leverage technology of all kinds to make the Coast Guard more efficient and ready for the future. Situational awareness, a key concern in the military, is a top priority. He must make information broadly available to Coast Guard personnel in a timely manner without creating information overload.

Tozzi anticipates that the toughest part of the job will be getting organizational buy-in. It helps that he's an insider; he already knows the 32 other flag officers in the organization, and he's been on both the operational and the managerial sides. "If we start imposing requirements on people and turn this staff into a quasi-regulatory bureaucracy, then they will go off and do their own thing, and we'll never get our arms around this," he says. Instead, Tozzi expects to include the officers in the strategic planning process so that they will have a say and a stake in the changes.

There's little concern about not receiving enough support from above. Not only will Tozzi be a top officer in the newly consolidated systems organization (reporting officially to its chief), he has the ear and attention of the Coast Guard's commandant and chief of staff. "I've had four or five discussions with [Coast Guard Commandant Admiral] Robert Kramek on various aspects of this job as he sees it, all initiated by him," Tozzi notes. "He's obviously very interested, and that makes me very interested." The search may be over, but the mission is just underway.

–Richard Pastore

plish. "We've done a fairly poor job over the years of educating the public and legislature—of, in effect, marketing ourselves," says Bradley Dugger, chief of information systems for the state of Tennessee. On the state level, having a designated CIO (or equivalent IS leader) to address technology issues makes it easier for legislators to grasp the impact of IT in their districts, Dugger says. "With the advent of CIOs, we've been able to deal at a higher policy level." Legislators now have a single IT spokesperson "instead of having 25 people run at them from each department."

Lobbying is not part of a private sector CIO's job description; in the public sector, by contrast, that task is essential to success. With the legislative branch holding the purse strings, CIOs must have an ongoing dialogue with legislators. The political landscape adds a degree of uncertainty that private sector CIOs do not face. When the makeup of the legislative body changes every two or four years, the chance of having the plug pulled on projects rises. Few legislators have a firm grasp of technology and what it can accomplish in government; nevertheless, public sector CIOs must reach out to them.

Before coming to California, Flynn developed an IT Expo in Massachusetts to do just that. Flynn put his staff's recent work on display at the Statehouse so that legislators could get a firsthand look at how the state used IT. "The legislature wanted to know how we spent 'their $100 million' each year," says Flynn. When testifying in budget committee hearings, "you end up spouting technogibberish. What they really want is something they can look at and touch."

It's not just the legislature that is subject to frequent change. Turnover is also more frequent in the executive office than in the private sector. For CIOs appointed by the head of the executive branch, a turnover at the top can mean they're out of a job. Many public sector IS chiefs survive such a transition, but even then there is another problem. "In government, just about the time you have your boss trained, he moves on," points out

DID YOU KNOW...

DEFICIT DATA

The last consecutive two-year period without a federal budget deficit was 1956 and 1957, when the United States enjoyed a $7.3 billion surplus. The most recent year without a deficit was 1969.

SOURCE: *A CITIZEN'S GUIDE TO THE FEDERAL BUDGET* (*GOPHER://SUNNY.STAT-USA.GOV:70/11/BUDGETFY96*)

PHOTOS COURTESY OF THE U.S. COAST GUARD

DID YOU KNOW...

WHERE DOES IT ALL GO?

Most of the federal budget is spent on a few major programs: Social Security, 22 percent; defense, 18 percent; Medicare and Medicaid, 16 percent; and interest on the national debt, 15 percent. The controversial programs of welfare and foreign aid accounted for less than 3 percent of proposed fiscal year 1996 spending.

SOURCE: *A CITIZEN'S GUIDE TO THE FEDERAL BUDGET* (GOPHER://SUNNY.STAT-USA.GOV:70/11/BUDGETFY96)

George Molaski, president and CEO of IDC Government, a consultancy in Falls Church, Va. (IDC Government is part of International Data Corp., a division of *CIO*'s parent company, International Data Group.)

In addition to frustrations stemming from political uncertainty, government CIOs face other frustrations unique to the public sector. For instance, the pace of government activity can be painfully slow compared with that of free enterprise. "In government, they are already working on the 1998 budget," says DiPentima. "You have to look two years ahead." Planning over such a long time frame prevents the government from adjusting to changing market conditions on the fly. Private industry adapts to change more quickly.

Those who have worked in both the public and private sectors notice the fundamental difference between the two immediately. "In private industry, you have the luxury to pick and choose what business you want to be in and what customers to focus on," says John Carrow, a former General Electric IS manager and the city of Philadelphia's first CIO, working in the Mayor's Office of Information Services. That's obviously not true in the public sector. "Government is not a single business," says Steve Kolodney, director of the Department of Information Services for the state of Washington. "The business of government is actually many different businesses, from prisons to parks to public safety to social and health services." Consequently, capital planning is more complicated, requiring a CIO to "prioritize and choose projects to work on," Carrow says.

JOE THOMPSON: *"If you don't make a good case, you don't get the money."*

PHOTO BY KATHERINE LAMBERT

The political landscape adds a degree of uncertainty that private sector CIOs do not face.

The Cohen Act and procurement reforms in some states should give CIOs more flexibility and reduce the time required to purchase new systems. In the past, a burdensome federal procurement process often meant a wait of two years from when a project was proposed until the agency actually bought the equipment. "The process of acquisition was longer than the technology development cycle," DiPentima says. That long process was designed to ensure fairness, discourage corruption and prevent the selection of vendors based on political favor, but it was too slow for effective technology acquisition.

The Cohen Act addresses that inadequacy. A number of cities and states have also reformed their procurement policies in recent years. New York, which "has tighter procurement policies than the federal government," according to Balzano, instituted small-scale pilot programs free of red tape to test new ideas and ascertain whether the cost of a full- scale rollout was justified. At the recommendation of a private sector task force commissioned by the mayor of Philadelphia in 1992, a team consisting of the Mayor's Office of Management and Productivity and the Mayor's Office of Information Services came up with similar streamlining. Carrow says, "We created a Productivity Bank, a revolving $20 million fund. If a department has an idea that was not budgeted, they can borrow from the Productivity Bank to fund the project."

Government, renowned for slow bureaucratic machinations, is not usually conducive to swift entrepreneurial initiatives. Just ask George Lindamood, former IS chief for Washington state and now a private consultant. His proposal to turn the Department of Information Services into a state-owned nonprofit corporation was snuffed out in the legislature

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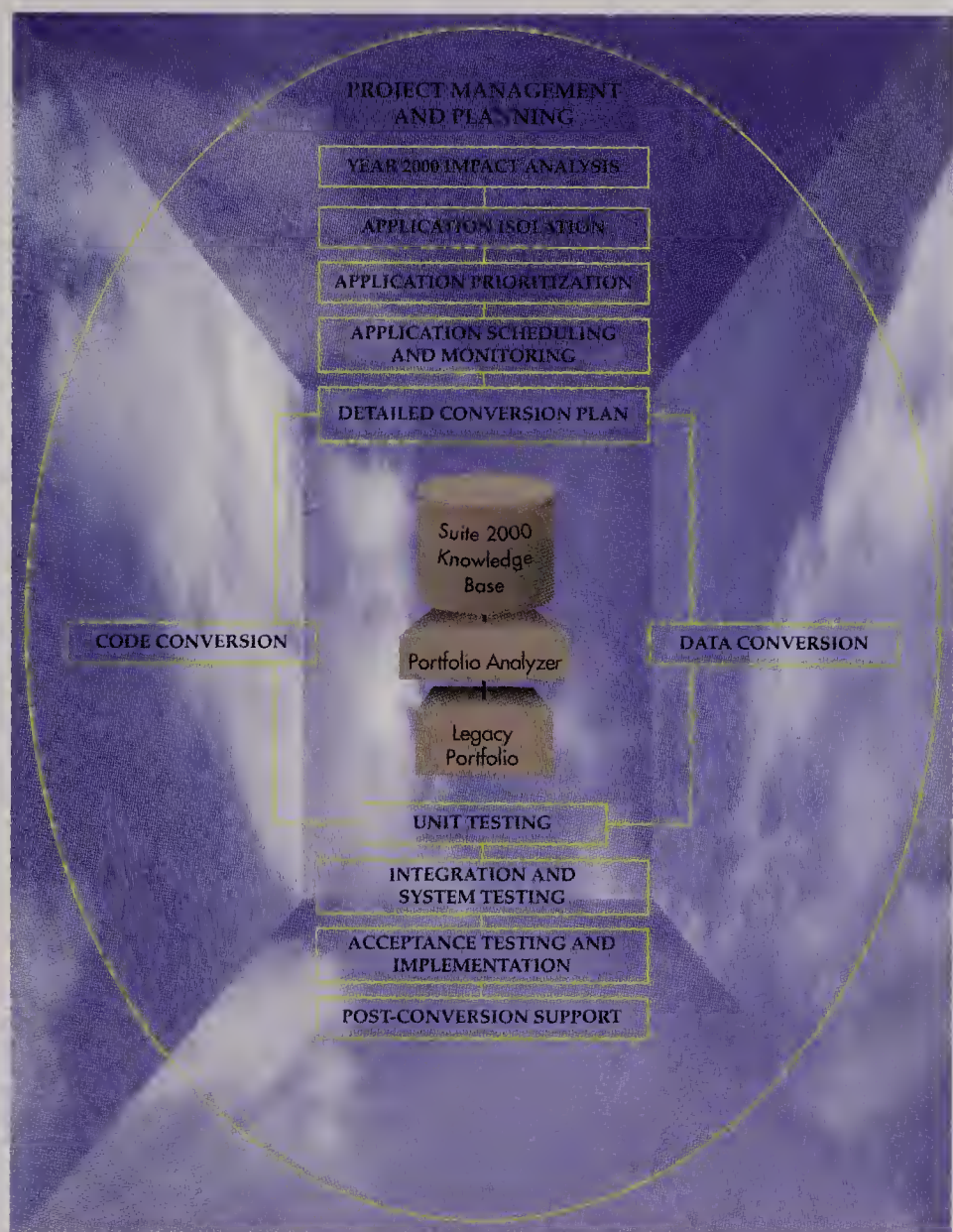

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without so much as a hearing. Lindamood says the proposal was doomed by opposition from the state employees union—whose members were concerned that other agencies would follow suit—and legislators who were loath to let the opposition party's governor take credit for reforms that might actually work. "I could sell these ideas to a businessperson because I wouldn't have to deal with the politics," Lindamood says. "But in state government [the issue is], 'Will this help me get reelected or will it help my opponent?'"

In addition to political infighting, public sector IS chiefs face the wrath of the taxpayer and media outlets hungry for scandal. Government CIOs face the scrutiny of the press and the public like no private sector IS chief will ever see. The Denver International Airport's baggage handling system debacle is the consummate example of this phenomenon: Nearly every major media outlet reported the story. Major system failures occur regularly in the private sector, but few make national headlines. As a result, "there is a reluctance to take even reasonable business risks in the public sector," says Kolodney, because the rewards of success are not as high as the consequences of failure.

Dugger points out that stopping a project in the early stages makes for bad publicity even if it is clearly the right thing to do. "If we pull the plug on a project that has spent $2 million rather than spending the full $15 million, it suddenly turns into a huge failure, even though it could have been a much bigger loss," Dugger says. "We all need to be held accountable, but we can never be perfect. We *are* dealing with some massive projects. In the private sector, failures don't get as much press. Those of us in the public sector understand that that's not going to change."

Despite such complaints and lower pay than the private sector offers (only 6 percent of government respondents to a recent *CIO* salary survey made more than $100,000; see "Full Market Value," *CIO*, February 15, 1996), government IS honchos are almost universal in their enthusiasm for their work. After all, many say, the potential for making a difference in the quality of life in the United States is greater than in any private sector organization. "The decisions you make have an impact on the way in which people are connected to the government," Kolodney says. "Watching the governor sign a piece of legislation that you participated in drafting is very satisfying." For some, such as Flynn, the challenge of working in government is irresistible. "It's a fertile, target-rich environment for improvement," he says. All told, says IDC Government's Molaski, "[government CIO jobs] could be the most exciting positions in the IT-community today." CIO

JOHN CARROW *participated in the formation of Philadelphia's $20 million Productivity Bank.*

PHOTO BY ED WHEELER

Staff Writer Peter Fabris can be reached at pfabris@cio.com.

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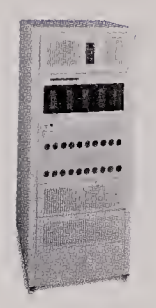

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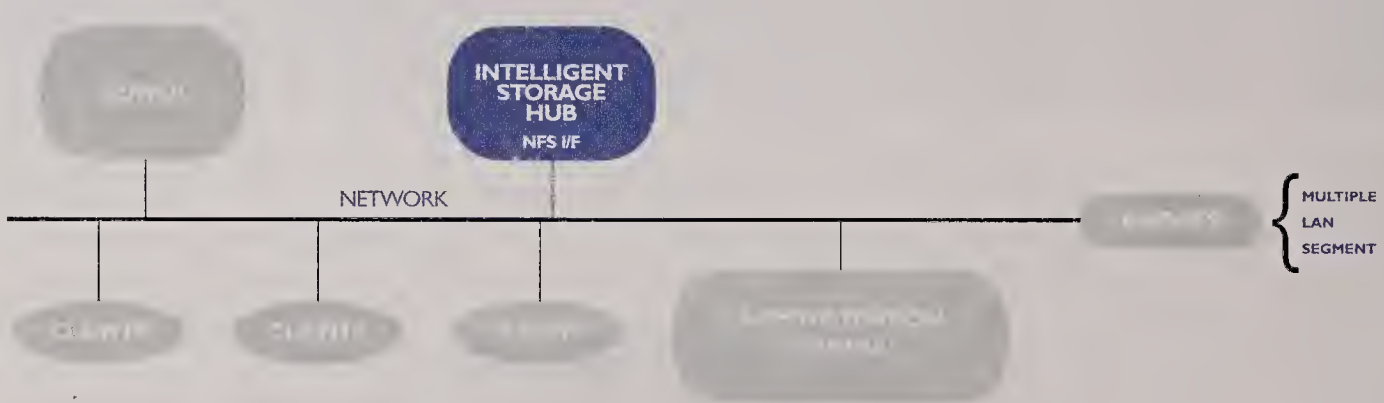

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■ DESPITE THE GOVERNMENT'S REPUTATION FOR RETROGRADE I.T., THESE FEDERAL AGENCIES HAVE A THING OR TWO TO TEACH THEIR CORPORATE COUNTERPARTS

BY MEGAN SANTOSUS

Focusing on customers. Doing more with less. Improving service.

Hardly unusual aspirations for most companies, particularly those lusting to beat the competition or grace the pages of the next Tom Peters management tome. But what about the public sector? Government agencies don't have to worry about market share, profit margins or customer retention. Given that lack of competitive pressure, federal agencies in particular can afford to be the last bastions of customer indifference and molasses-like delivery of services.

Maybe that's why CIOs in the private sector generally scoff at the idea of learning a thing or two from federal agencies, which most people think operate with all the efficiency of a filibuster. But while the days of lumbering federal bureaucracies are far from over, they are at least slated for extinction, thanks to performance improvement initiatives and legislation (see "Mandate for Change," Page 84).

"Government, at all levels, is under pressure to adopt the same kinds of management practices that companies are using," says Ian D. Littman, a partner at Coopers & Lybrand in Arlington, Va., and co-author of *Improvement Driven Government: Public Service for the 21st Century* (Coopers & Lybrand Total Quality Management Services, 1995). Like many of their private sector brethren have done for years, government agencies are just now grappling with the challenges that require more efficient ways of operating. Chief among the issues driving this trend are tighter budgets, downsized workforces and constituents who increasingly demand better service. And while Littman and others contacted for this article declined to single out one agency for overall high marks, the agencies profiled here all use information technology in ways that can enlighten their private sector counterparts.

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UNITED STATES CUSTOMS SERVICE

(A branch of the United States Treasury Department)

Headquarters: *Washington*

Mission: *Collect import duties and taxes, ensure that all goods and people entering and exiting the United States comply with regulations, and enforce laws of other U.S. agencies*

Challenge: *Improve both customer service and risk management capabilities*

Web Site: *www.ustreas.gov/treasury/bureaus/customs/npr.html*

For the United States Customs Service, improving customer service and effectively managing risk are often conflicting goals. On one hand, Customs wants to make bringing goods into the country as easy and painless as possible. On the other hand, Customs must ensure that goods—and people—entering the country comply with all U.S. laws. With information technology, the agency is better equipped to satisfy those dueling missions.

SAM BANKS: *Using IT, Customs decides whether or not to single out you and your luggage for inspection before you even step off the plane.*

PHOTO BY KATHERINE LAMBERT

"I don't want to make it sound like we're Big Brother," asserts Sam Banks, assistant commissioner of field operations, "but we know which passengers we want to talk to before they even set foot in this country." Banks is referring to an advanced passenger information system that provides officials a heads-up on incoming airline passengers. The Interagency Border Interdiction System (IBIS) collects data from airport passengers as well as from other agencies, such as the State Department and the Immigration and Naturalization Service. At airport checkout counters overseas, airline employees swipe machine-readable passports and visas through magnetic-strip readers. Passenger identification information is automatically transmitted directly into Customs' system, which targets people for interviews based on predetermined criteria (Banks can't divulge details of the criteria, because of security concerns). Although Customs currently receives information on only about half of the 55 million commercial airline passengers who fly into the United States each year (not all documents are machine-readable and not all airlines have the proper equipment), Banks predicts that identification information will be available on 85 percent of incoming passengers within five years. Nevertheless, backlogs at Customs counters in U.S. airports when interviews were random have practically been eliminated. "Before the system, the standard for moving people through airports was 45 minutes," Banks says. "Today, the majority of people leave airports within five minutes of getting their bags."

Moving passengers smoothly through airports is only one area where information technology is making Customs more efficient. Technology is also helping the agency tackle the mammoth task of ensuring that imported goods—which annually amount to $700 billion worth of merchandise—comply with U.S. regulations and quotas. Customs can't possibly inspect every shipment for compliance, because of sheer volume and costs. So Customs' systems help pinpoint shipments most likely to violate regulations, says Jim Ryan, director of the applications development division. For example, auto parts shipped from Chrysler in Canada to Chrysler in the United States are considerably less risky than a plane full of flowers coming in from Colombia. "We must have a systematic approach as to what containers to look at because everything isn't equal," Ryan says.

That systematic approach is created by the automated commercial system (ACS) imple-

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DID YOU KNOW...

BUSY BORDERS

More than 100 million vehicles, 55 million commercial airline travelers and 40 million pedestrians pass through U.S. land border ports of entry every year.

SOURCE: U.S. CUSTOMS SERVICE *(WWW.US-TREAS.GOV/TREASURY/BUREAUS/CUSTOMS)*

mented a few years ago; the IBM 9000 mainframe-based system links 12,000 PCs and terminals around the country over an X.25 packet-switched network. The ACS contains several features such as inventory control, electronic invoices and import quotas that enable Customs to track, manage and process all commercial shipments entering the country. One such component that helps identify cargo that Customs wants to examine is known as "selectivity."

"Basically, selectivity is a screening mechanism that helps us allocate our resources," says Banks. All imported goods are classified in a database according to regulations, quotas, tariffs, etc. To clear a shipment for entry, Customs agents enter the specific cargo information into the selectivity program. (In 97 percent of cases, information from importers is electronically transmitted to Customs ahead of time, and 80 percent of shipments are cleared prior to arrival, according to Banks.) A series of tiered, rules-based prompts in a database written in CICS Cobol help agents determine whether to release a shipment or hold it for inspection. In addition, ACS automatically feeds relevant data to numerous federal agencies that have an interest in incoming goods—including the Food and Drug Administration, the Department of Transportation, the Fish and Wildlife Service and the Department of Agriculture. For example, whenever Customs detects counterfeit textile products, ACS automatically forwards that information to the Committee for the Implementation of Textile Agreements (CITA).

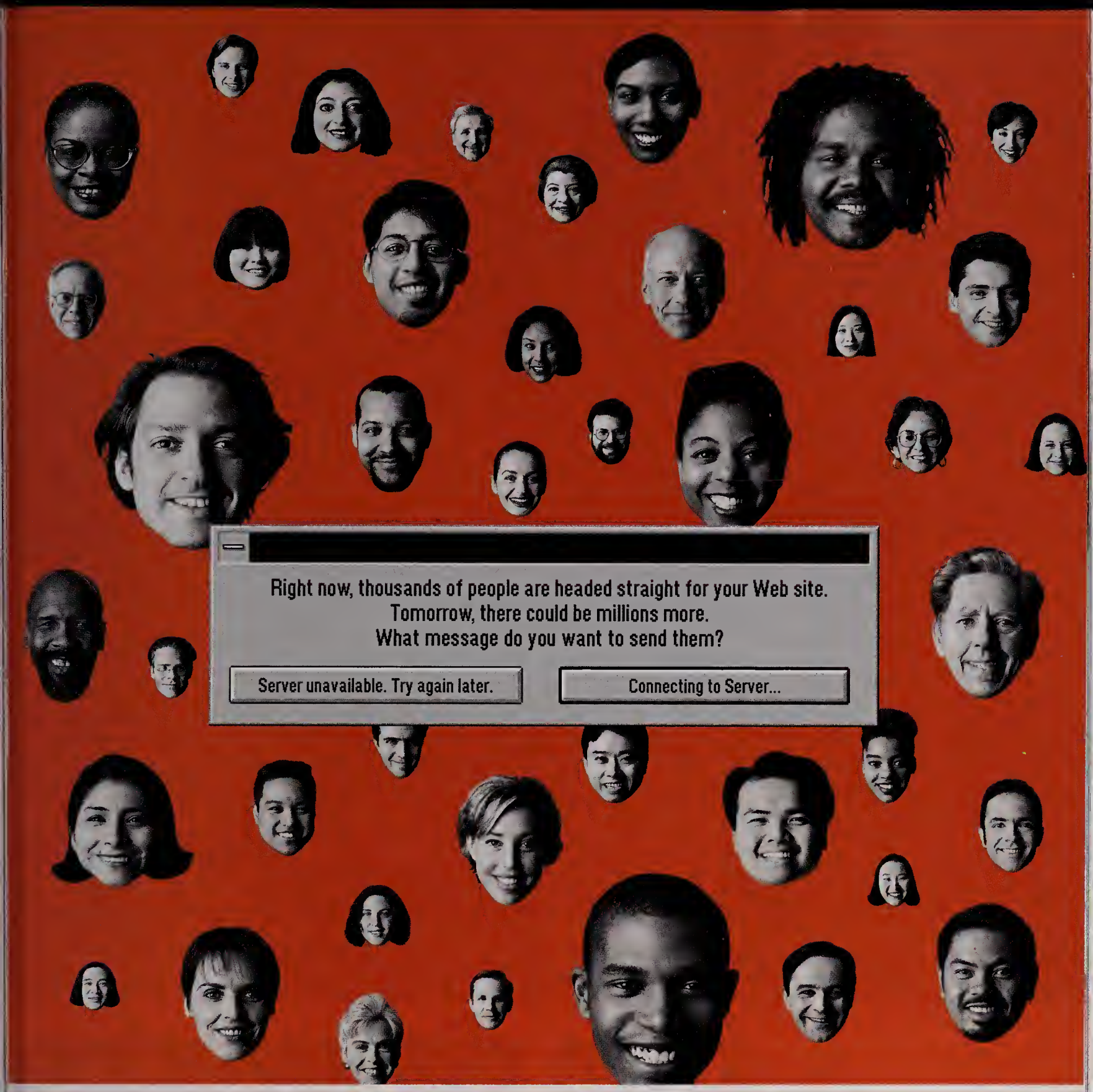
JIM RYAN: *The ACS provides a systematic approach to inspection.*

About four years ago, Customs began analyzing data collected in ACS to develop historical profiles of industries. "We now have statistics that give us a real picture as to how compliant specific industries are in specific areas," explains Banks. Now Customs can break down how compliant the auto industry is with health and safety regulations or how often software companies violate intellectual property rules. Customs uses this data not only to spot trends but also to help individual companies comply. "What we want to do is work with a company on a compliance plan that's in line with national levels," says Banks. "Our objective is to get out of the 'gotcha' mentality and instead adopt a community policing attitude where we try to prevent problems through awareness."

To further that aim, Customs is in the midst of a four-and-a-half-year reengineering of the import process. The future client/server-based system, known as the automated commercial environment or ACE, will combine into a data warehouse all of the historical data now stored in separate components of the ACS. In light of recent systems blunders by the Internal Revenue Service and the Federal Aviation Administration, Customs' efforts have not passed without scrutiny. In a report issued on May 9, 1996, the General Accounting Office praised Customs' reengineering initiatives but cautioned that the agency is leaving itself vulnerable to failure by not adhering to best practices such as conducting cost-benefit analyses and feasibility studies before committing to systems modernization.

Customs officials downplay the importance of the criticisms and say they will adopt the GAO's recommendations, which include assigning accountability for implementing systems projects and completing passenger and export process redesign upfront. Despite the quibbling over methods, the GAO approved of Customs' efforts to move away from looking at imports on a shipment-by-shipment basis and instead set up customer accounts for individual companies. That move would position Customs to improve service at a time when the amount of trade is on an upswing, Banks says. "We'd be completely swamped without automation," he adds. "Over the past few years, the volume of trade has doubled, so we've got to be much more productive."

PHOTO BY KATHERINE LAMBERT



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SOCIAL SECURITY ADMINISTRATION

Headquarters: *Baltimore*

Mission: *Ensure the economic well-being of Americans through programs such as Social Security Insurance, Supplemental Security Income and Medicare*

Challenge: *Improve customer service despite a downsized workforce and a larger workload*

Web Site: *www.ssa.gov/#Agency*

In this era of wringing out "extra" costs, many businesses have to do more with less. But for the Social Security Administration (SSA), the downsizing sponge has sucked up particularly large reservoirs of resources. Today, the SSA has 63,000 employees—down from 81,000 a few years ago—in 1,500 locations. Conversely, as the Baby Boom generation creeps toward retirement, the number of people whom the SSA serves grows. Today, more than 43 million people receive monthly benefits, adding up to more than $300 billion annually. If the current percentage of people using SSA benefits holds, by 2020 the agency's caseload will increase by 45.5 million people. "Reason enough to make customer service a top priority," says Dean Mesterharm, deputy commissioner for systems.

One key to achieving this goal is to have well-trained, knowledgeable employees. Legislative changes that put new demands on how employees dispense benefits and interact with the public occur at least once a year, according to Ruth A. Pierce, deputy commissioner of human resources. Recently, for example, Congress passed a bill that eliminates disability payments to drug addicts and alcoholics. "By January 1997, our people have to terminate 200,000 disability cases," Pierce says. "Because termination of any case requires due process, we have to train our people how to take the appropriate steps."

Without the help of IT, the SSA would have to hire 17,000 people by the year 2000 to keep up with its workload.

Additionally, employee training must not only be consistent on a national level, but given the frequency of changes, it must also be cost-effective, Pierce says. So the SSA is relying heavily on technology to meet those demands.

In response, the systems group has implemented a satellite-based, interactive distance learning system that is currently in 200 locations. In the classrooms, employees interact with instructors via a one-way video, two-way voice communications system. Using personal training station keypads, employees can answer multiple choice questions. With the built-in microphones, they can ask questions of their instructors, who appear on the video monitors.

The distance learning system will be implemented nationwide once the SSA installs LAN-based client/server systems in offices throughout the country. (A contract for 1,800 LANs and more than 55,000 Pentium-class intelligent workstations was awarded early this summer; implementation is sched-

RUTH PIERCE: *Distance training will allow the SSA to survive cuts while increasing service levels.*

PHOTO BY ROBERT BURKE

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COST CENTERS

Federal agencies spent at least $25 billion on information systems in 1993 and more than $200 billion over the last 12 years.

SOURCE: U.S. GENERAL ACCOUNTING OFFICE

uled to be complete by early 1999.) Mesterharm expects $27 million in lifetime travel expense savings once 500 locations are online. He also anticipates delivering video to employees' desktops once everyone is equipped with 486-based machines or better.

The distance learning system is also a tool to achieve another improvement in customer service—slashing the average time it takes to process and hand down a decision on a disability claim from 155 days to 60. By 2001, the SSA anticipates streamlined processes made possible by reengineering and a client/server-based automated case processing system.

According to Mesterharm, the current claims process involves 36 handoffs of information to different people. The SSA hopes to shrink the time frame by making information available electronically and reducing the number of handoffs and people required to review a claim.

Nearly 16,000 claims representatives will need extensive training to make this change possible, which would have been a truly daunting and expensive task with face-to-face instruction, which often required employees to travel to a central location for weeks at a time.

The SSA also hopes to make employees more efficient by implementing a range of productivity and automation tools. The agency has an investment fund of $1.275 billion to spend on these kinds of technologies over the next five years, according to Martin E. Baer, deputy assistant commissioner for systems. Baer anticipates that productivity tools such as CD-ROM-based procedure manuals (now in many locations) will eliminate nearly 20 feet worth of binders filled with regulations for processing different claims. With legislation wreaking major policy changes on a frequent basis, CD-ROM is a cost-effective and efficient way to disseminate critical information to employees in the field.

The Internet figures prominently in the GSA's improved customer responsiveness. The agency launched an online shopping service in March, which registered sales of more than $250,000 during the first full month of operation.

DEAN MESTERHARM: *An expert system that helps employees field phone calls accurately and efficiently is projected to save the SSA 170 million in administrative costs.*

PHOTO BY ROBERT BURKE

To speed service and reduce errors, the systems group has also developed an expert system that leads teleservice representatives through a series of questions designed to elicit the correct information in a single phone call. As a result, the teleservice representatives now provide correct answers to questions 99.9 percent of the time, compared to 94 percent previously. Now being piloted at three locations, the system is expected to save $170 million in administrative costs once it's installed in the SSA's 37 teleservice centers, Mesterharm says.

Client/server-based systems will save a lot of trees as well as time and effort. "By the year 2007, our workloads will increase to where we'd need another 17,000 people just to maintain our current service performance," Baer says. "This is an opportunity for us to use technology to help deal with that situation."

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GENERAL SERVICES ADMINISTRATION

Headquarters: *Washington*

Mission: *Provide goods, supplies and services to other federal agencies*

Challenge: *Improve customer service and procurement processes*

Web Site: *www.gsa.gov*

More than most agencies, the General Services Administration (GSA), has a financial incentive to behave like a private organization. As a supplier of goods and services to other federal agencies, the GSA sets its own prices and thus must be careful to recover its costs. "We provide a variety of services to other federal agencies within the executive branch, including telecommunications, information services, real estate management and development, and procurement," says Deputy CIO Don Venneberg. "Although a small amount of our budget is appropriated, most of our operations are self-funded."

DON VENNEBERG: *The internet is the way to deliver better, faster and more convenient service.*

PHOTO BY KATHERINE LAMBERT

In the past, the GSA has shouldered its share of criticism. In 1993, the National Performance Review (NPR) issued a report blaming the GSA's centralized control over spending and procurement for, in effect, handcuffing its customers by dictating how and where they could spend their money. In order to help its fellow agencies be more effective, the GSA had to reinvent itself, the NPR concluded. Among the NPR's recommendations: Provide both employees and customers with access to information and improve customer service by providing one-stop shopping and streamlined procurement processes.

One goal encompassed in that mission is to give agencies better access to information about how they spend their money with the GSA. For example, a new information system implemented at the end of 1995 tracks the office space that agencies and other federal tenants lease from the GSA's building services division. Using Lotus Notes and the GSA's existing communications infrastructure, the information system, called Gamis, keeps tabs on the more than 8,000 buildings and 300 million square feet of space that the GSA owns and manages. The heart of Gamis is a geographic information system from MapInfo Corp. that lets portfolio managers view graphical summaries of data. "Everything is point and click, so it's very easy for non-computer people to use," explains Louis Adams, deputy CIO of the division. "Someone can start with an overall view as to the amount of space we manage and break it down to regions, cities, even neighborhoods."

If a tenant requires an additional 50,000 square feet of space within an existing location, a property manager can locate vacant space in seconds. "Before, we didn't have any way to bring all the real estate information together, so we couldn't accurately tell any agency just how much space it was utilizing in all of our buildings," Adams says.

Adams predicts that customers will benefit even more once they are able to tap into the system themselves via the Web to check out a building's interior and exterior and even the surrounding neighborhood. However, be-

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DID YOU KNOW...

HELPING HANDS

More than 43 million people received Social Security benefits in February 1996, an increase of nearly 1 percent from February 1995. The majority, 62 percent, were retired workers, who received an average of $720.

SOURCE: SOCIAL SECURITY ADMINISTRATION HIGHLIGHTS OF SOCIAL SECURITY DATA, FEBRUARY 1996 *(WWW.SSA.GOV)*

fore that happens, the GSA must revamp its architecture; by fall, the agency plans to upgrade PCs throughout the network to a 486-level or higher and provide Internet access to every employee.

The Internet figures prominently in the GSA's improved responsiveness to customers. In March, the supply service division, which provides $1 billion worth of goods annually to government agencies, launched GSA Advantage, a shopping service on the World Wide Web that runs on a Sun Microsystems Inc. SparcStation server. During the service's first full month of operation, $250,000 worth of items was purchased online, an amount GSA officials expect will skyrocket once all vendor contracts are included in the system.

Advantage provides both a single point of contact for customers and an easy way to place orders for items as wide-ranging as insect repellent and cherry pickers, according to Ray Hanlein, assistant commissioner for Federal Supply Service (FSS) information systems. Previously, purchase orders were submitted electronically via EDI and processed through the GSA's mainframe system in a batch mode. Now orders are received instantly, and billing is consolidated. Depending on an agency's internal policies, customers can also use credit cards to make purchases.

Once Advantage goes full throttle, Hanlein expects it to be a boon to everyone involved. "Customers won't have to maintain copies of contracts or vendor catalogs, and pricing can be updated in real-time," he says. What's more, the FSS can provide ordering and billing histories for agencies quickly and accurately, something not possible when purchase orders where shuffled back and forth.

Venneberg predicts that similar Internet applications will spring up throughout the GSA. "Advantage is a model for other services we offer," says Venneberg. "We are definitely looking to leverage the Internet to make us more efficient and allow our customers more access to what we have to offer." CIO

Senior Writer Megan Santosus can be reached at santosus@cio.com.

FOR MORE INFORMATION

On the Social Security Administration's Disability Process Redesign Plan see *gopher://gopher.ssa.gov:70/00/G-Disability_Benefits/6_Disability_Redesign_Plan*

On the National Performance Reviews report about the General Services Administration, see *www.npr.gov/NPR/Reports/GSA1.html*

MANDATE FOR CHANGE

The push for better, more efficient government began in 1993 when Vice President Al Gore's National Performance Review (NPR) sounded the call for improving federal agencies. Among the NPR's recommendations were setting customer-service standards, streamlining the workforce by 272,000, trimming $108 billion in costs and cutting internal red tape. Subsequent congressional legislation such as the Government Performance and Results Act and the Paperwork Reduction Act also gave federal agencies a collective kick in the pants to reinvent themselves, improve operations and cut costs.

It is hoped that the overhaul will remedy the inefficiencies that have become a familiar part of government lore:

- **Manual Labor: The federal government established detailed procedures for making personnel decisions. Agencies hiring, firing and promoting employees had to go by the book—all 100,000 pages of it. The rules were summarized in a handy "little" 10,000-page manual that was recently scrapped.**
- **Rules and Regulations: To ensure that private businesses don't rip off the taxpayer when the government hires them to do the people's work, the government has created procurement rules—thousands of pages of them—so stupifyingly difficult, time-consuming and costly to follow that many good companies won't even bother to bid. All in all, the *Code of Federal Regulations*—the government's rulebook—is enormous. If you want a copy for your library, you'll need a shelf 21 feet long.**

–M. Santosus

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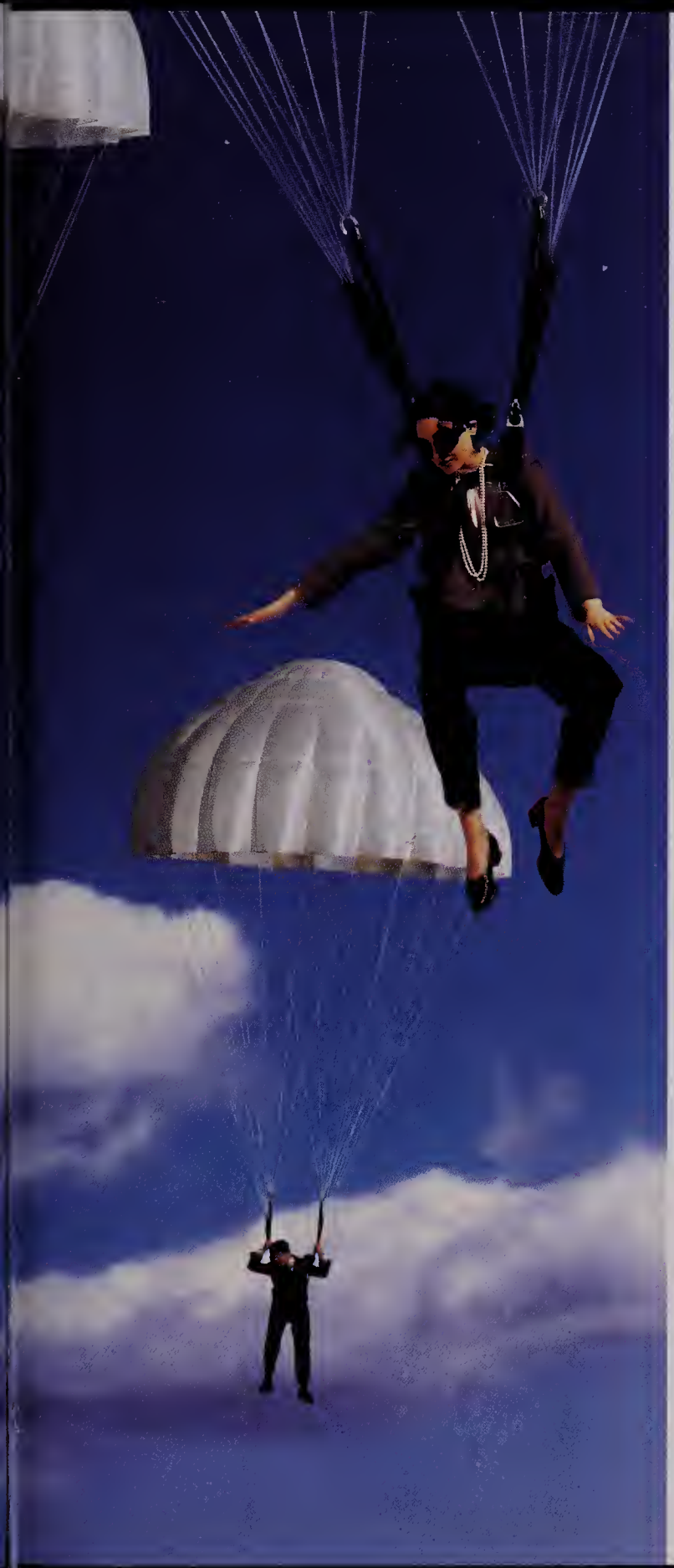

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PROFILE: MUNICIPAL I.T.

Phoenix Rising

■ THE PROCESS THAT BROUGHT I.T. TO THIS DESERT CITY WAS NOT AS CLOUDLESS AS ITS WEATHER

BY TOM FIELD

Phoenix Mayor Skip Rimsza arrives at work, checks his e-mail and discovers a citizen's complaint about a city park's damaged tire swing. "It's been broken for more than a month," the correspondent writes. The mayor forwards the note to the Parks and Recreation Department, and the swing is fixed. No phone calls, no red tape. One electronic interaction,

JOSEPH R. MOTTO *(l.) and* **FRANK FAIRBANKS** *(r.) lead Phoenix's IT vision.*

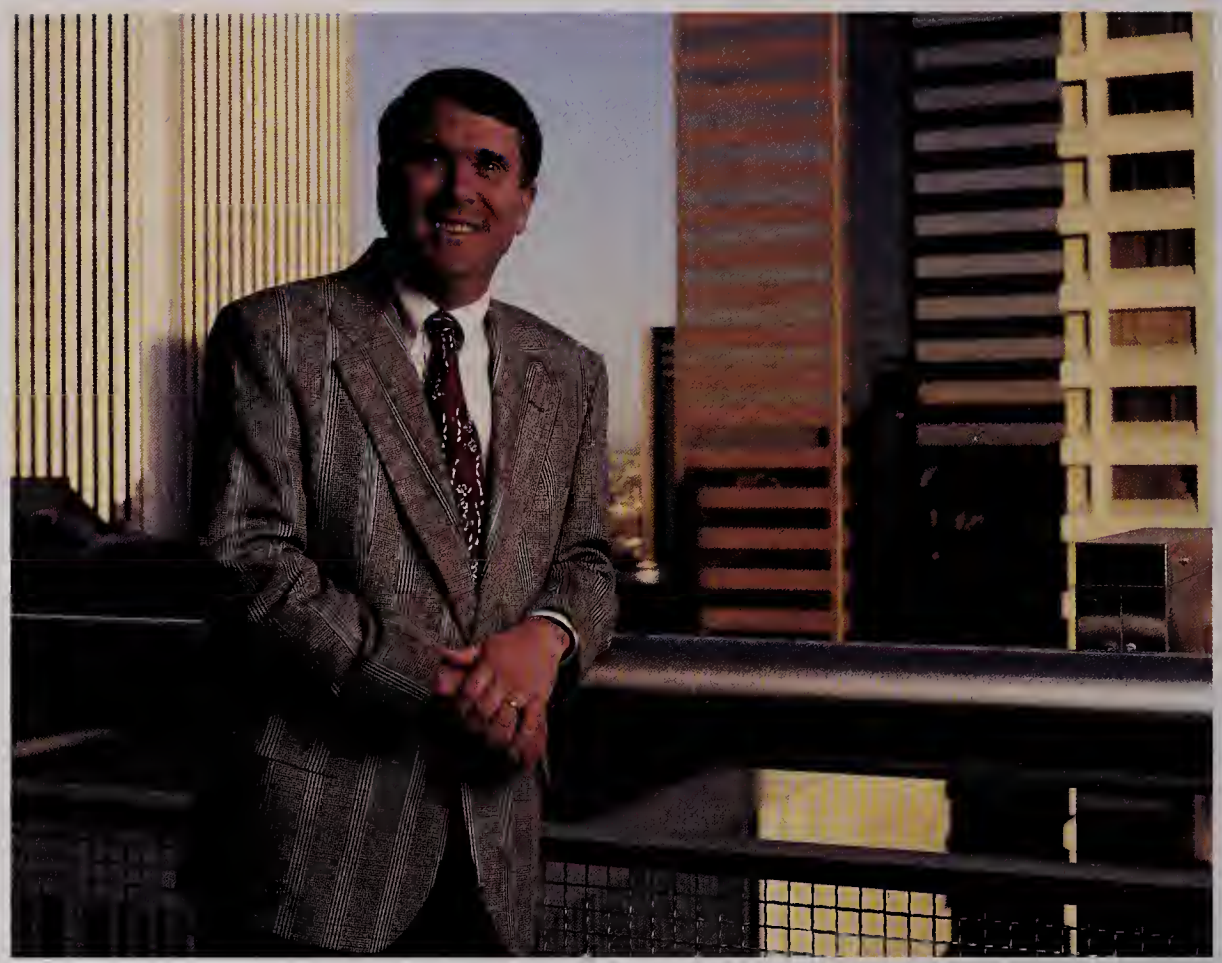
and a citizen's problem is solved. "Everyone's a winner," Rimsza says.

Phoenix has committed itself financially and philosophically to improving city government through the use of information technology. The city's IT philosophy of "Any, Any, Any"—any information, at any location, to any authorized user—extends to city staff and residents alike. "The city was fine-tuning its approach to sophisticated technology while other cities were still wondering if they should make the shift to electric typewriters," according to *Financial World*, which in 1995 named Phoenix the best managed of the nation's 30 largest cities. Two years earlier, Germany's Bertelsmann Foundation awarded Phoenix the Carl Bertelsmann Prize for being the "best-run city government in the world." Public Technology Inc. (PTI), a Washington-based nonprofit agency that assists U.S. communities in developing technology solutions, named Phoenix its 1994 Technology Achievement Award winner and in 1995 cited the city for a number of IT innovations. "Phoenix is not a usual community; it is an *unusual* community," says PTI President Costis Toregas. "[City leaders] have understood and incorporated IT inside their skin," he adds.

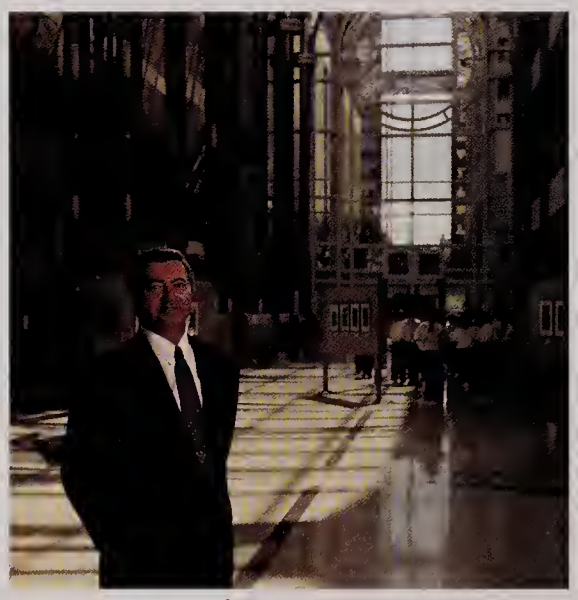
"Our customers demand it," Rimsza says. "They're getting [IT] in the private sector, where the government traditionally lags. We don't want to lag; we want to lead."

Most ambitious of Phoenix's internal innovations is its new $7.6 million geographic information system (GIS), which combines census, geographic, infrastructure and zoning data in a common database. The GIS relies on Oracle Corp.'s software development tools and the Environmental Systems Research Institute's Arc/Info macro

PHOTOGRAPHY BY DAVID SCHMIDT



MAYOR SKIP RIMSZA: *"We don't want to lag; we want to lead."*



JOSEPH R. MOTTO *decentralized MIS and put technology—and responsibility—on the desktops of city employees.*

language to provide data previously maintained by individual city departments. "We don't want redundancies," says Deputy IT Director Bill Bayham, who oversees the GIS. "A lot of these departments use common data but for their own specialized purposes. Our idea is to use the GIS as a database to enable users to do things they otherwise couldn't do." Phoenix's Information Technology Department (ITD) administers the GIS using a client/server architecture that links relational databases via a Token Ring network. Individual departments, however, are responsible for maintaining data. The Planning Department, for instance, refreshes census and zoning information, and the City Clerk's Office tracks parcels and ownership.

Among the GIS applications:

- Public Works Department managers establish "optimum vehicle routes" for trash collection with the help of a GIS-generated map that indicates land parcels, one-way streets and an estimate of when trash vehicles should be full.
- If a prospective business owner applies for a liquor license, the Planning Department calls up a map of the site to determine the local crime rate and the proximity of churches, schools or other liquor-licensed establishments.
- Through the use of GIS maps, Fire and Police Department officials deploy personnel based on data about the density of a district's population, the age of an area's structures and the demographics of its residents.

Almost no Phoenix citizen is more than three miles from a workstation.

All of the city's 460 square miles of parcels, streets and rights of way have been mapped except for sewer/water facility data. When fully functional, the GIS database will

PHOTO LEFT BY DAVID SCHMIDT; PHOTO ABOVE BY BOB RINK

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HAVES AND HAVE-NOTS

Of the 77 U.S. communities with populations of more than 200,000, Detroit, Newark, N.J., and Cleveland have the highest percentage of households receiving public assistance (26.1, 22.2 and 21.9 percent, respectively). Arlington, Texas, had the lowest, with only 2.7 percent receiving assistance.

SOURCE: 1990 U.S. CENSUS

be of use not just to city employees but perhaps to businesses that might want to "rent" the service. "It's another arrow in the quiver at the desktop," says Bayham.

IT also has helped improve the city's emergency services, where simple efficiency can mean life or death. Dispatchers process emergency calls with computer-aided dispatch, emergency personnel track relevant information through mobile data terminals (MDT) in their vehicles, and all incident data is logged in a special database—Oracle and Novell Inc. LAN applications for the Fire Department and a Unisys Corp. A15 mainframe for the Police Department's Police Automated Computer Entry system.

According to Deputy Fire Chief Harry Beck, automated dispatch and MDT alone have significantly cut the Fire Department's response time. And through e-mail, the city's 3,000-plus police and fire employees at dozens of remote sites maintain better communication. Further, IT has challenged department employees to learn new skills that are physically less demanding. "That gives them career choices," says Fire Department Administrator Jim Wortham. "A few years ago, people in the Fire Department didn't know how to spell 'intermodal relationships.' Now they have them on their computers."

CITY MANAGER FRANK FAIRBANKS: *"We need to be every bit as fast, every bit as efficient and every bit as willing to break new ground."*

The city's sometimes rocky road to IT pre-eminence has been led by City Manager Frank Fairbanks. A 23-year city employee and six-year city manager, Fairbanks says his IT interest began years ago, when he was recovering from surgery. "I had a home computer, but I never really had gotten into it," Fairbanks says. "So, I got myself a bunch of computer books and started getting into the PC on my own. What occurred to me right away was the ease with which I could get information." As Fairbanks recuperated, Phoenix was reevaluating its use of IT, which—like many cities—had begun in the mid-1960s with a citywide mainframe system that originated in finance and was later administered by MIS. "But it was a very poor fit between the people who needed data and the understanding of the programmers of what data the people needed," Fairbanks says.

When Joseph R. Motto, the current ITD director, came to Phoenix as head of MIS in 1985, "there were running jokes about MIS," he says. "The technical staff was about as good as any I'd seen, but the management of the place had been kind of screwed up." With Fairbanks' blessing, Motto decentralized MIS and put technology—and responsibility—on the desktops of other city employees. That empowerment helped build employee confidence in IT.

The next objective was IT reengineering, which got a boost in 1988 when voters approved a $1.2 billion city bond issue—$42 million of which was earmarked for IT projects such as the GIS database. In 1989, Phoenix contracted Andersen Consulting to help create a strategy. Andersen's 1990 report urged Phoenix to continue to decentralize its IT and bring a more corporate perspective to its deployment. As a result, Phoenix in 1991 created an Information Technology Management Department (ITMD), directing it to write a set of city IT standards and craft a 10-year technology management plan (see related story, Page 98). In 1994, ITMD and MIS were combined to form today's 200-employee ITD, which accounts in large part for the city's total technology expenditures, representing about 3 percent of the city's $1.4 billion operating budget.

The biggest technical speed bump on the road to IT innovation occurred in 1984, Motto says, when MIS installed a new Water Services Department system without adequately testing it or listening to the concerns of some employees who were in on the de-

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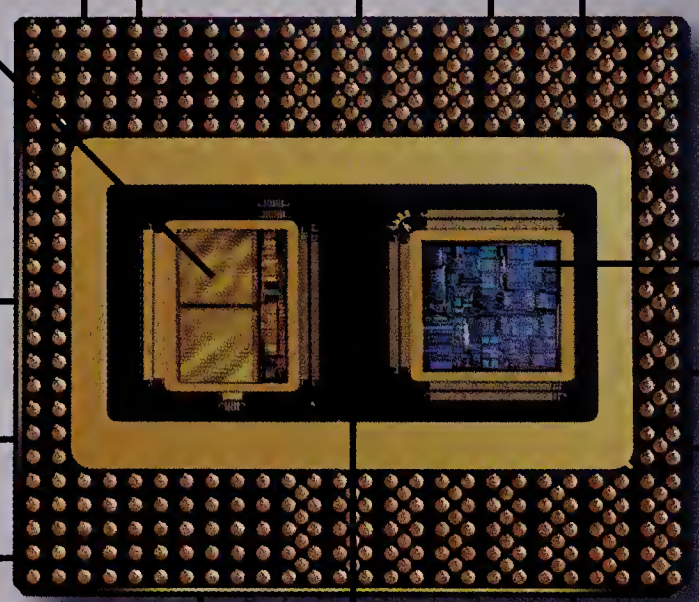

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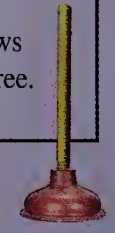

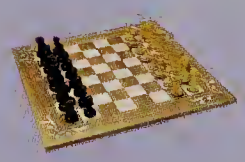

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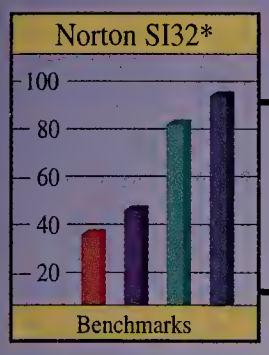

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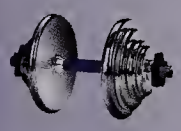

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INCOME DISCREPANCIES

San Jose, Calif., has the highest median household income ($46,206) of U.S. communities with populations of 200,000 or more. Miami has the lowest, at $16,925. Phoenix ranked somewhere in between, with a $29,291 median.

SOURCE: 1990 U.S. CENSUS

HARRY BECK: *Automated dispatch and MDT have cut the Fire Department's response time.*

velopment. "That recovery effort was a couple of years long," Motto says, but it taught the city to involve more departments in system development and to pay attention when red flags are raised.

Individual city departments are encouraged to participate in cooperative training efforts with county, state and local business groups.

Decentralization also caused some initial problems in the late '80s, when departments that had been joined at the technological hip suddenly weren't communicating with one another at all. "There were little fiefdoms of technology," says Deputy IT Director Jack Thomas. The solution was to bring together the city's top technologists in a group that meets monthly to discuss issues and plot IT strategy.

Another hurdle was "selling" IT concepts and applications to elected officials, city employees and residents. To the City Council, which approves the annual city budget, the bottom line *is* the bottom line. "Some city councilors have struggled with the capital costs necessary [to support IT]," Rimsza says. But he counters that IT has helped the city offer more efficient service to a larger population without unduly increasing staff or budget. The city's 1 million-plus population has grown by nearly 10 percent since 1990, but in '92 and '93 Phoenix actually eliminated 500 city positions. In a subsequent "city attitude" survey, residents gave the city all-time high marks in 24 of 25 categories. "I don't know how we would have accomplished that," Fairbanks says, "without data processing, fast access to information and more efficient government through information technology."

Training has been crucial to winning over Phoenix's 12,000 city employees. The City Clerk's Office not only employs three full-time instructors to train new employees in

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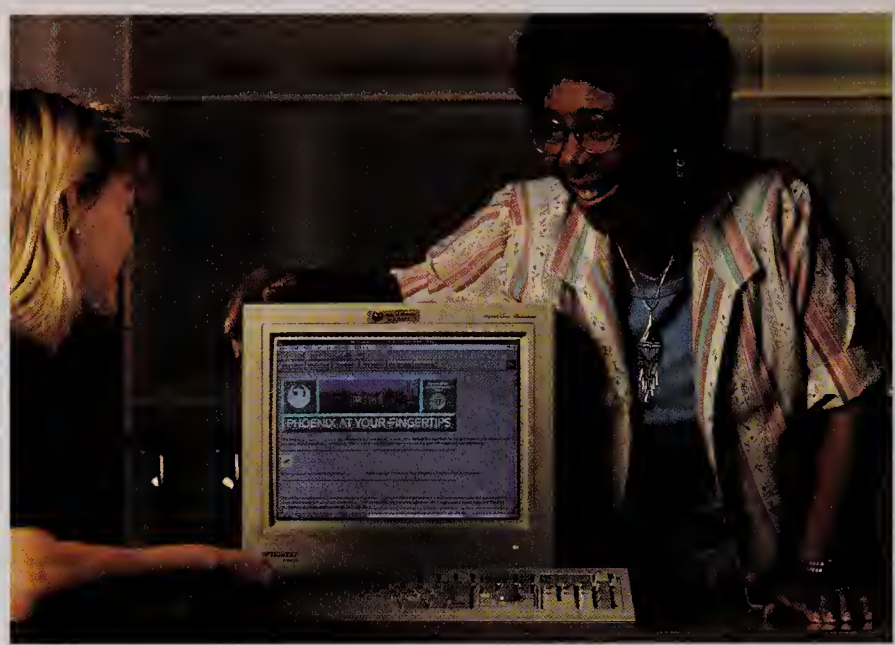

ETHEL M. GRIFFIN *(r.) is training to be a "computer buddy."*

systems and applications, but individual departments are encouraged to participate in cooperative training efforts with county, state and local business groups. When IT became prevalent in City Hall, Deputy City Clerk Jeannie Miller says it was a challenge to help employees develop computer skills and make the transition from paperwork to electronic work. "But we found people were more than happy to get rid of paper," Miller says. "Very, very few people did not make the transition." Fairbanks adds, "They feel ownership. They're actively engaged in what's involved to improve the systems."

While Phoenix citizens are the beneficiaries of IT in emergency services and government efficiencies, they also find convenience in their day-to-day encounters with city services: A new central library provides an electronic card catalog and a book ordering system with Internet links to outside libraries and resources; city buses allow passengers to pay fares with Visa and MasterCard; and a Wang-developed optical disk imaging system enables access via fax to more than 2 million pages of electronically scanned city documents.

The newest citizen service is Phoenix at Your Fingertips, a World Wide Web site (*www.ci.phoenix.az.us*) established through PhoenixNet, the city's electronic community access model (ECAM). The site offers profiles of city officials, instructions on how to do business with the city, and links to job opportunities, policymaking and Phoenix-related entertainment sites. Residents who don't have computers either at their homes or businesses can visit the Web site from browser-equipped PCs located at 30 community centers throughout Phoenix. Almost no Phoenix citizen is more than three miles from a workstation, and trained personnel are available at each site to assist users. (See "No Cover, No Minimum," Page 26.) Phoenix at Your Fingertips went online in October 1995, and the response has been encouraging, says Deputy IT Director

I. T. STANDARDS IN PHOENIX

The Phoenix Information Technology Department has created a book of information technology policies, standards and guidelines. With prior approval, departments may deviate from these standards but only after justifying the application's business benefit. Among the standards:

DESKTOP COMPUTERS: IBM-compatible PCs

DATABASE SOFTWARE: Microsoft Corp.'s Access and FoxPro

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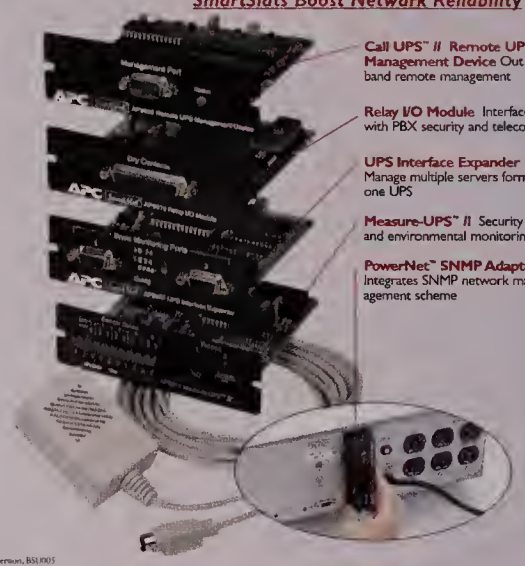

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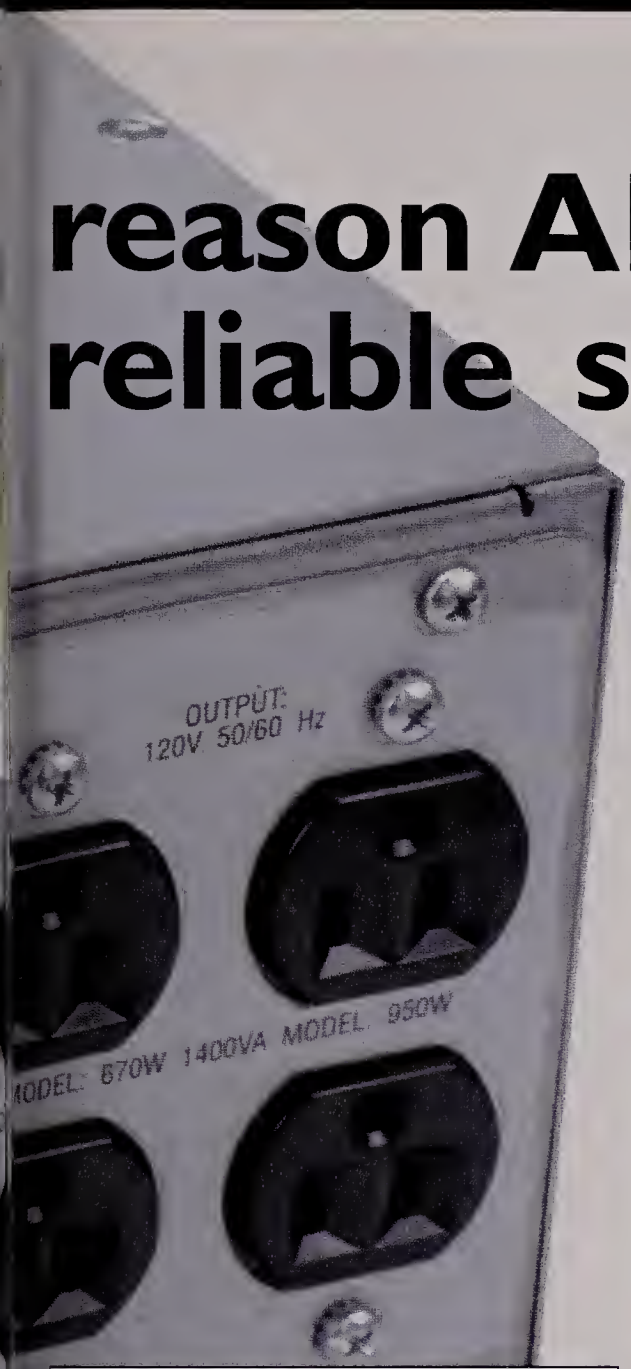

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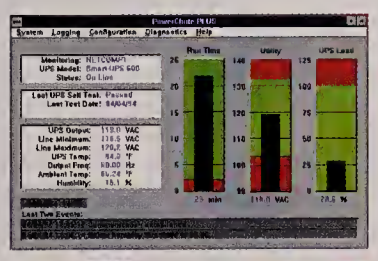

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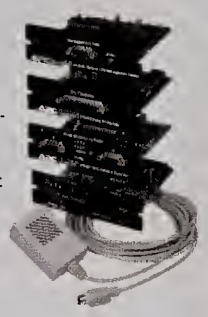

UPS Interface Expander — Provides two additional ports to facilitate safe system shutdown and advanced UPS management of up to three servers from one UPS. The unit is ideal for "server farms" or multiple operating system environments, since all three servers can be running different OSs.

Measure-UPS II — Provides monitoring of temperature, humidity and other environmental conditions through the interface for PowerChute *plus*, PowerNet SNMP or Call-UPS II users.

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Measure-UPS II	AP9612TH AP9612T	Temp, humidity and external sensors AP9612TH without humidity sensing.	$199 $149
Relay I/O Module	AP9610	Monitoring and control via dry contacts	$179
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Share-UPS	AP9207	For up to 8 servers sharing 1 UPS	$349
Measure-UPS Switch Kit	AP9813	Monitor cabinet access via Measure-UPS	$99

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DID YOU KNOW...

BABY BEAMERS

According to a survey by Princeton University, 58 percent of births nationwide are recorded on electronic birth certificates and reported electronically to a vital-statistics agency. Thirty-seven states have some form of electronic birth certificates.

SOURCE: PUBLIC HEALTH REPORTS (SEPTEMBER 1995)

Kristine McChesney. The next challenge, she adds, is to equip the workstations with printers so that city forms can be downloaded by users at remote sites. "Unless you're at home or at work," McChesney says, "electronic access isn't enough."

Susanne Shaphren, a citizen watchdog who has tracked city issues at Phoenix's City Plaza and online for the past 14 years, is disappointed that there are not *more* services available electronically, and she says some citizens have had trouble hooking up to the existing offerings. "I'm not sure the neighborhood associations or the average citizen at this point would be comfortable using [the city's online services] as his or her only source of information," Shaphren says.

But another citizen, 75-year-old Ethel M. Griffin, accesses the city's services with her home PC and says she is so impressed that she is training to be a "computer buddy" to help other citizens use the PhoenixNet workstations. "I'm very excited," Griffin says of the city's IT efforts. "We have a lot of young seniors in Phoenix, and they're interested in new things to help improve their quality of life." An 18-year volunteer at the Paradise Valley Community Center, Griffin says that e-mail access to city officials is probably the initial electronic attraction to citizens. But the true test of IT will come when the novelty wears off and city officials can see how many citizens continue to use electronic services, she adds. "So far, I think it's great," Griffin says. "It's the way to go—the way of the future."

Future challenges are both small and large. Short term, Phoenix plans to implement a new financial management system, further develop PhoenixNet and migrate from employees' current two-way radios to an 800MHz digital trunked radio system. Intranet development also is a hot topic, as is the ongoing transition from an IBM Corp. mainframe to an open architecture. Then there's the year 2000 conundrum, which many cities are struggling to overcome. Long term, city officials want to keep pace with technology without being overrun by it—"to strike a balance between leading edge and bleeding edge," says Assistant IT Director Danny W. Murphy.

"As the private sector improves its product delivery and quality of service," Fairbanks says, "we need to be every bit as fast, every bit as efficient and every bit as willing to break new ground." CIO

Staff Writer Tom Field can be reached at tfield@cio.com.

NORTH OF THE BORDER

Vancouver is where Phoenix was

Two years into an open-ended information systems strategy, Vancouver, British Columbia—Canada's third-largest city—continues to plot its course and has just approved its first major IT purchase, a $2.8 million document imaging management system. "I'm pleased with our progress," says City Manager Ken Dobell. "And I'm counting on continued progress."

Vancouver's information systems strategy is part of a Better City Government initiative. The BCG program, endorsed by the City Council in 1994, identifies 15 key areas for review and process redesign, with special emphasis on human resources, technology and finances. The IT portion of the plan was prepared by the Coopers & Lybrand Consulting Group and calls for the city to create a technological infrastructure to improve the flow of information and delivery of service inside and outside City Hall—without raising taxes.

To date, Dobell says, the city has defined its technology architecture, established an Internet presence (*www.city.vancouver.bc.ca*) and begun studying broadband communications. When the City Council in March approved the purchase of the document imaging management system, Dobell described it as the city's first major step toward achieving its IT goals.

So far, the city's IT efforts have gone largely unnoticed by citizens, Dobell says. "But why should they get excited about promises?" The excitement will come in the next year or two, he says, when citizens are able to enjoy the benefits of the imaging system and further connectivity with City Hall. "I'm very pleased at this point," Dobell says, "but there's still a great deal to do."

-T. Field

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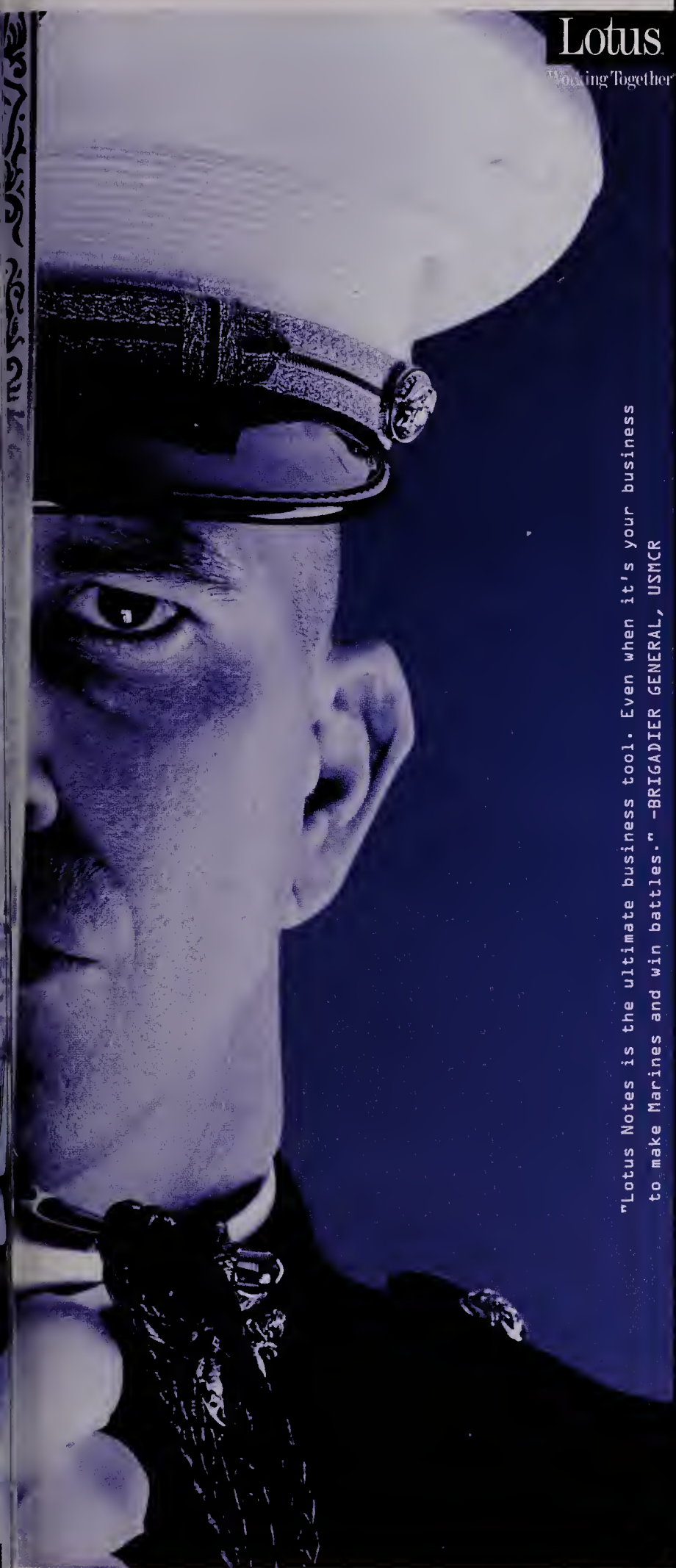

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A Sure, Secure Thing

New software and hardware can help protect your business, but the technology is only as good as the plan it supports

BY JOHN EDWARDS

Like jumbo shrimp, military intelligence and original copy, the phrase "Internet security" was once considered just a contradiction in terms. The potential for breaches from cunning hackers, snooping employees, disgruntled ex-workers and out-and-out cybercrooks made the leap into Internet technology risky—if not downright imprudent—for many businesses. But not anymore. Recent technological advances are providing the tools to make the Internet a safer, though not totally secure, place to work.

Those tools are hitting the market with remarkable speed; sorting through them to make the best purchases is not easy. "The market is evolving at a rapid pace and change is occurring almost daily," says Bill Cheswick, a senior researcher with Bell Laboratories in Murray Hill, N.J.

Cheswick, co-author of *Firewalls and Internet Security: Repelling the Wily Hacker* (Addison-Wesley, 1994), says that some basics of Internet security can guide a CIO's investments.

ILLUSTRATION BY PAUL GARBETT

Firewalls: A First Defense

Firewalls—the hardware-software combination that stands as a barrier between an organization's Internet resources and the outside world—are an organization's first line of defense against Internet intruders, notes Mike Fitz, Reston, Va.-based product manager for the Internet services division of Sprint's business group. Cheswick adds that a sound firewall plan should be a part of an organization's security strategy. While the definition of exactly what constitutes a firewall continues to be revised, the majority of products fit into two broad categories—gateways and packet filters. Some products combine both approaches.

Gateways themselves come in a variety of forms. One popular approach, the application gateway, restricts user access to a particular application. Under this model, users are typically required to enter a separate log-in to reach the database or application protected by the gateway. Two other common gateway techniques, circular gateways and proxy servers, also keep unauthorized users out of protected areas.

Despite the relatively solid protection they offer, gateways can be difficult for network managers to configure and for end users to navigate. In addition, the need to pipe all inbound and outbound network traffic through a single point increases the risk of creating substantial data bottlenecks. As a result, vendors offering gateway security products often blend the technique with packet filtering, an approach that provides a faster, though potentially less effective, security solution.

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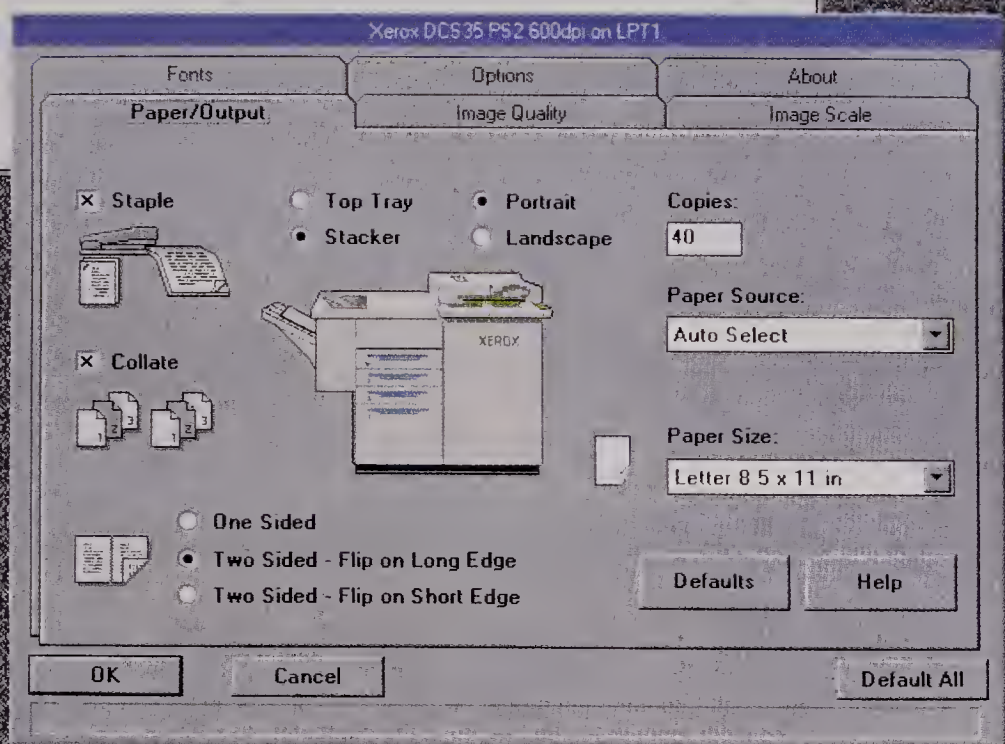

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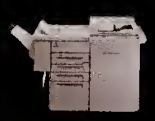

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tocol (IP) packets based on a packet's originating address. A packet is accepted only if it originates from an authorized location, thereby assuring that packets from legitimate users will be able to enter a network while data from other parties will be turned away.

Unfortunately, basic no-frills packet filtering, such as the type that comes standard with many types of routers, can be defeated by a determined hacker. An IP address can be "spoofed," or changed to make it appear as if a packet came from an authorized system, fairly easily by someone with knowledge of the Internet's technical structure. A far more secure approach calls for the packet filter to examine the packet for an authorized IP address and to also read the data contained within the packet. This technique allows the firewall to place a stream of packets into context and take specific action based on the information it retrieves (such as dropping an FTP connection once the transaction has been completed). Many packet filters also analyze each packet to make sure that its physical origin matches its IP address.

Of the two dominant firewall choices—gateways and packet filtering—Cheswick prefers the latter, particularly products that offer built-in intelligence. "They give you the speed you need for today's work," he says. Fitz adds that packet filtering is becoming a "standard in the Internet security field."

Besides keeping out hackers and other unauthorized individuals, a firewall can be used to safeguard against viruses and other rogue codes, although that use of the technology is far from widespread. Tools are now coming onto the market that scan for viruses as data arrives at the firewall. Trend Micro Inc., for example, offers InterScan VirusWall. The product, which works with Sun Solaris systems, scans e-mail and FTP, including uuencode, base64, binhex and PKZIP formats, for possible viruses. It can be configured to notify more than one person of a potential problem, save the file to a protected area or delete the file. Prices start at $20 per node for a 50-user license, decreasing with larger numbers of users.

Firewalls also help protect against viruses by limiting access to authorized users, adds Dale Bortolani, manager of the professional services organization unit of Sarcom Inc., a Columbus, Ohio, computer reseller and systems integrator. "This isn't a guarantee that someone won't inadvertently introduce a virus, but it cuts down on the chance that someone will [be able to] do it intentionally," he says.

"Firewalls, especially, are often misused. There can be so many holes in the firewall that the only thing that's secure is the firewall. It's like having a giant stone gate in the middle of a desert."

–Bill Cheswick

But Bell Labs' Cheswick is skeptical of a firewall's ability to serve as a productive virus-fighting tool. "The firewall is the wrong place to check for a virus," he says. "It's too easy for a hacker to fool the firewall by hiding or compressing the code." Scanning files with conventional virus scanners is a more sensible solution, even for the extra effort it requires, Cheswick says.

Tunneling Technology

While firewalls are the bulwark of Internet security, many organizations are continuing to search for a better technology. One approach that's beginning to gain popularity is tunneling—the concept of using encrypted IP packets to create, in effect, a virtual private network.

The prospect of lower networking costs is a prime reason for the sudden interest in tunneling, particularly among organizations that need to link multiple networks or off-site employees with a departmental network. Typically, companies that need to connect two local area networks separated by a great distance have leased a private line and create a wide area network, explains Russ Jones, the Palo Alto, Calif., program office director of Digital Equipment Corp.'s Internet business group. With tunneling, the networks are connected via the Internet—firewall to firewall—and data is sent through encrypted IP packets. "You're essentially transitioning your expensive private leased-line traffic over to the low-cost Internet," he says.

Tunneling technology can also be used to safeguard individual networks within an organization. A firewall could, for example, block unauthorized employees in a company's accounting department from accessing files on the human resources department's network. Similarly, unauthorized workers on an HR network in a San Diego branch office could be prevented from examining files stored on the headquarters HR network in Los Angeles.

Data sent through Internet tunnels can be every bit as secure as information transmitted through leased lines. "The latest encryption technology is really very, very secure," Jones says. The security also isn't suffocating. Jones explains that by granting encryption keys, network administrators can allow users outside the organization—business partners, for example—to burrow their own tunnels to the network.

Tunneling from a PC to a network—as employees who travel or telecommute may need to do—is just as easy as tunneling between two networks. "Someone who has traditionally dialed out into a network and has incurred telecommunications costs can now simply dial into the local Internet service provider," Jones says.

But tunneling also presents some drawbacks, particularly in the area of compatibility. In fact, tunneling technologies offered by various vendors are largely incompatible, meaning that all of a tunnel's end points (both networks and remote users) must be

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carefully matched and coordinated. "We're years away from all tunnel end points being compatible," Jones says.

Another negative aspect is that tunneling adopters lose some of the "absolutes" they've taken for granted with private lines, such as guaranteed bandwidth. But Digital's own experience with the Internet shows that tunneling typically outperforms a 56Kbps leased line, Jones says.

Tunneling's encryption requirements also can burn up a lot of server processing power, warns Sprint's Fitz. But he calls that a temporary concern. "If technology continues to grow at its current pace, I don't see processing overhead becoming a bottleneck." In the meantime, some vendors are looking into the possibility of offloading encryption onto a dedicated chip, he notes.

Security Limits

Despite the power of firewalls and tunnels, CIOs are advised to regard the technologies as a secure lockbox rather than an impenetrable bank vault. Firewalls in particular can't be solely relied upon for all of an organization's Internet security needs, says Bell Labs' Cheswick. "It's like putting a wall around a town because we don't want to have strong locks on our front doors," he says.

In order to be most effective, a firewall must be designed creatively and crafted to meet the exact needs of its owner. That might mean storing particularly sensitive files on a separate, highly protected server or placing restrictions on one or more of a server's capabilities. Cheswick says he knows of one major company that had large amounts of software stolen via the Internet. "Now its firewall will only allow users to FTP outward at 1200 bits per second, the thought being that you can't steal a gigabyte without someone noticing it."

But a firewall or tunnel is only as good as the security plan it supports. For many organizations, the technology *is* the security plan—a big mistake. "Firewalls, especially, are often misused," Cheswick explains. "There can be so many holes in the firewall that the only thing that's secure is the firewall. It's like having a giant stone gate in the middle of a desert."

Loyal but misguided employees can be a big threat to Internet security. "For example, with modems now costing so little, people can put modems directly onto their machines and dial in at night to get around any inconveniences presented by the firewall," Cheswick says.

Many employees also allow their passwords, IP addresses and encryption keys to fall into unfriendly hands. "Technology is a wonderful tool, but it can't replace standard security practices such as regularly changing passwords and educating employees about security threats," Cheswick says. Even with secure tunneling technology, sloppy security management can lead to headaches. "When you're exchanging encryption keys with other parties, particularly with individuals outside of your organization, the possibility always exists that the keys can eventually reach unauthorized users," observes Digital's Jones. "Overall, you have to rely on common sense."

"Technology is a wonderful tool, but it can't replace standard security practices such as regularly changing passwords and educating employees about security threats."

–Bill Cheswick

CIOs, as a part of their planning, also need to look at Internet security from the inside out, says Sarcom's Bortolani. He notes that placing limits on what goes out of an Internet-linked network is as important as restricting what's coming in. "When my staff is sitting at their terminals, I like to think that they're doing productive work. So I want the firewall to make sure that they're not wasting time visiting Web sites and other places that aren't relevant to their work."

Managing Security

Implementing, configuring and managing a firewall or tunnel has proven to be a difficult and complex task for many organizations. Since the typical firewall or firewall-tunnel combination is made up of many tools, often from different vendors, getting the technology to perform the task it was designed for is hardly a snap. Although most products offer graphical user interfaces (GUIs) and other features designed for ease of use, the challenges remain formidable.

Many CIOs and their managers also are unfamiliar with complex firewall and tunneling concepts, Fitz says. "Bigger shops are bringing added expertise on board to establish a policy to implement and manage security measures," he notes. "But these things take a lot of man-hours and a lot of careful planning to put together." He adds that many organizations are turning to consultants and systems integrators for help with security planning and implementation.

The tunneling technology can be particularly tricky. "This is not the type of technology where someone reads the brochure and buys it," warns Digital's Jones. He recommends getting outside help and then launching a limited trial deployment. "It's not a 'throw the switch' type of thing," he adds.

CIOs and their managers should also carefully watch the market for evolving Internet security solutions. "If there were one absolute catch-all product out there, everybody would be using it," Bortolani says. "The choice has to be made based on the environment and the ultimate cost to your organization if important information gets into the wrong hands." CIO

John Edwards is a freelance writer based in Mt. Laurel, N.J. He can be reached at 70007.412@compuserve.com.

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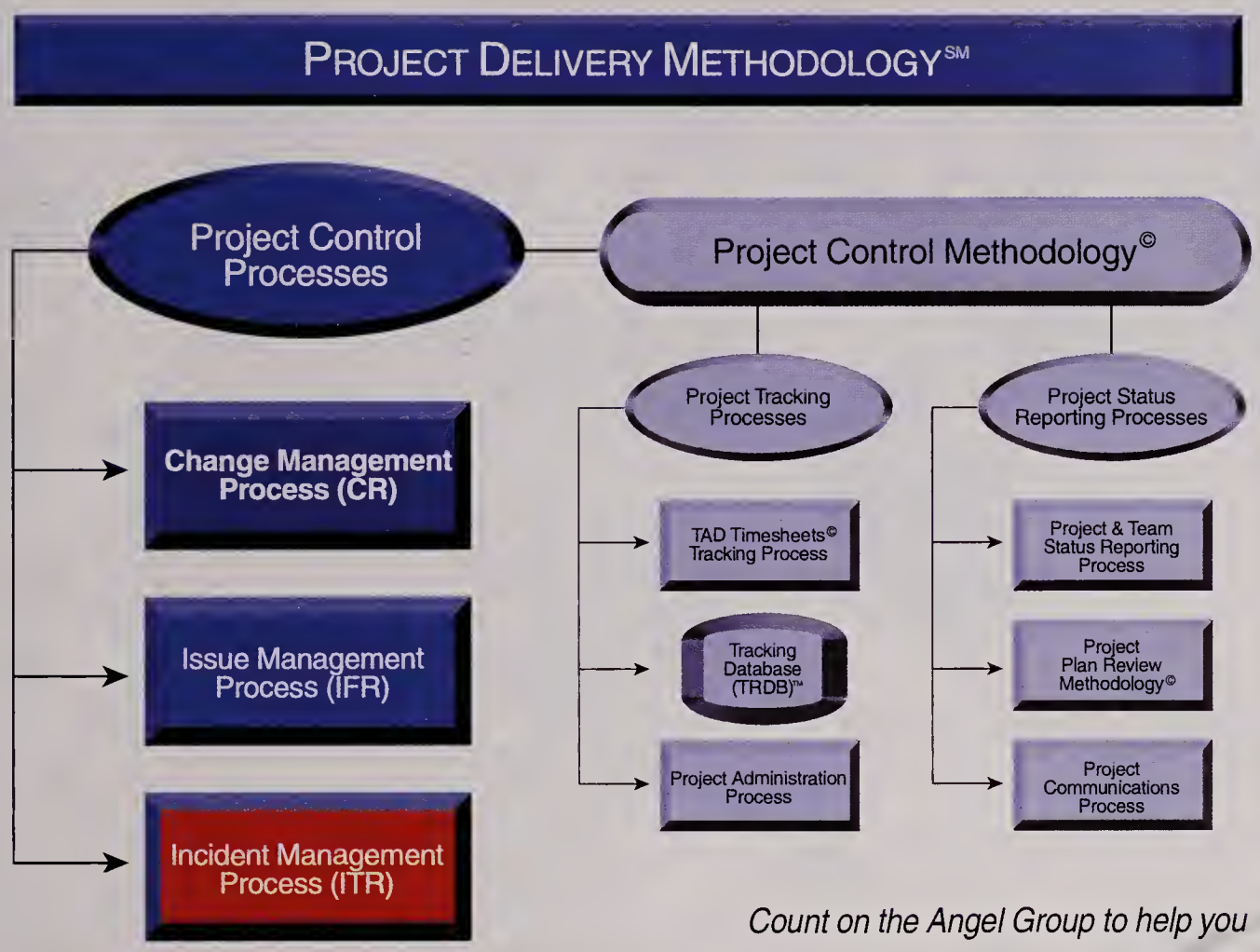

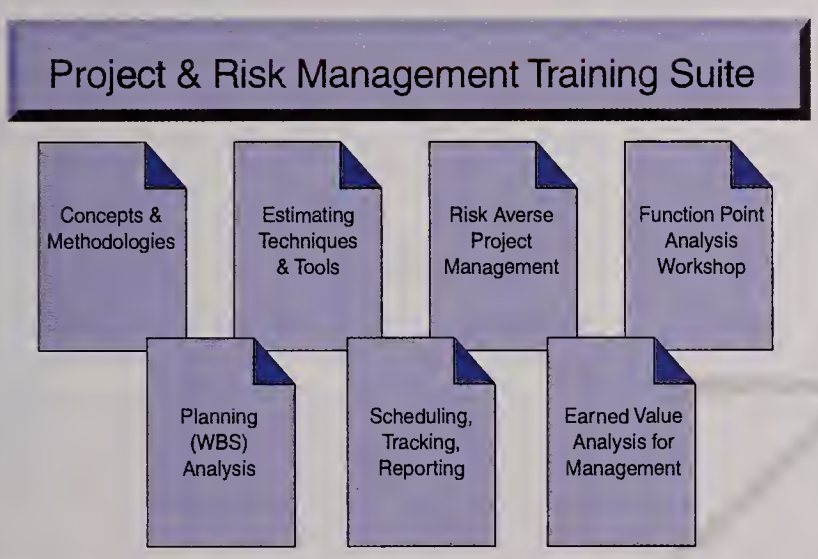

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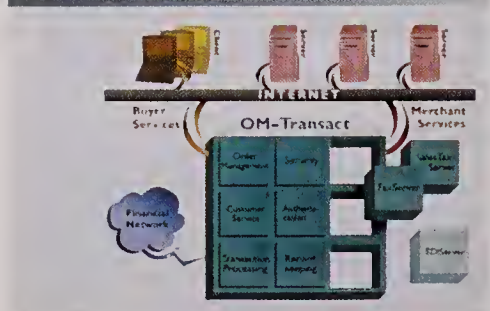

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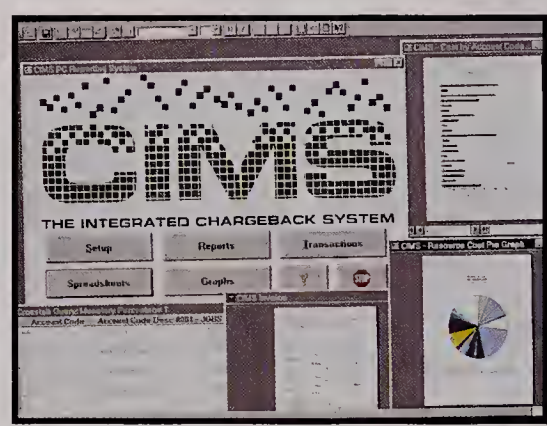
Platinum AutoAction is designed to enable users to manage heterogeneous systems distributed across a network, AutoAction automatically manages the availability of applications and systems across an entire enterprise, from mainframe to open systems. AutoAction is available for Unix, Windows NT, OS/2, OS/400, MVS and VSE platforms; pricing ranges from $4,500 to $45,000 for each primary server, depending upon platform and configuration.



Platinum CIMS, integrated chargeback and resource management software, is touted as a solution for outsourcing and internal resource management. Equipped with a Windows executive information system for desktop reporting, CIMS provides cost monitoring, resource accounting and chargeback of information resources used throughout a user's enterprise. CIMS operates in distributed environments running MVS, VM/VSE, Unix, Windows and NetWare operating systems. Pricing for Platinum CIMS 11.0 for MVS starts at $25,000, and CIMS 10.0 VSE starts at $12,000.

In the third phase of the company's rollout, Platinum enhanced its Enterprise Performance Management (EPM) product suite. DBVision and ServerVision have been added to the EPM suite, offering expanded database support and improved Unix server performance management. The EPM suite includes DBVision for Informix, Oracle and Sybase, and ServerVision for Unix.

For more information on the Oakbrook Terrace, Ill., company's products, call 800 442-6861 or 708 620-5000, or send e-mail to *info@platinum.com*.

Hey, Kids, Let's Start a Web Site!

Self-publishing on the World Wide Web just got even easier. LinkStar Communications Corp. recently introduced LinkStar Site Launcher, a software application that enables users to upload Web pages from a PC to a Web server and from there to the LinkStar Internet Directory and the world—all at the click of a mouse.

Designed to be used with any Web authoring system, including Java, LinkStar Site Launcher enables users to develop sites with text, graphics, audio and video. Users need only connect to the Internet, select the appropriate HTML and related files, and click the mouse; their files are transferred instantly to LinkStar's servers, where the Web sites are created automatically and incorporated into the LinkStar Internet Directory. From there, the sites are submitted to other Internet search engines such as WebCrawler, Lycos, Alta Vista and others.

The cost to use the service depends upon the size of the user's Web site. LinkStar will host Web sites on its own server for $9.95 per month for the first 100KB of a site, $19.95 per month for up to 1MB and $10 per month for each additional megabyte.

LinkStar Site Launcher is available for free downloading from the LinkStar Web site (*www.linkstar.com*). A Macintosh version, running on System 7 or higher and requiring 4MB of RAM, will be available in the third quarter of 1996. The software is scheduled to ship with Boca Research Inc.'s high-speed modems and is being licensed to such Internet service providers as CyberGate Inc.

For more information, call the Deerfield Beach, Fla., company at 954 426-LINK or send e-mail to *info@linkstar.com*.

CIO

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Red Light District

After a car struck a child, New York turned to client/server technology to catch traffic signal scofflaws

The benefits of information technology aren't always measured in revenues. In 1982, after a car ran a red light and hit an 18-month-old girl in a stroller, the New York Department of Transportation (DOT) started to research automated law enforcement systems to monitor and ticket drivers who don't know when to stop. New York's Red Light Vehicular Monitoring System, which hit the streets in 1993 after a series of delays, features 18 cameras that photograph vehicles that run red lights at high-traffic and accident-prone intersections. Since the camera program's debut, the number of tickets issued at the targeted intersections has continually decreased as drivers have caught on to the system. From 1994 to full implementation in 1995, ticket figures plummeted by 25 percent, proving that technology can be an effective deterrent to bad driving.

Each year, New York police officers issue about 1.6 million moving violation tickets by hand to drivers. The city has some 28,500 officers, yet red light runners can go unpunished for a very dangerous crime if an officer isn't on the right corner at the right time. Although automated red light cameras may seem like a no-brainer when it comes to catching drivers in the act, the program has had to overcome a few speed bumps along the way, according to Rudolph Popolizio, chief of the camera program.

First of all, some citizens and legislators were concerned about the Big Brother aspects of giving tickets by camera and computer. "The technology was so different and new, not everybody was receptive," Popolizio says. "We had to tread lightly. It's something people see as Orwellian." State legislators passed a law in 1988 to allow the DOT to use photographic evidence to issue notices of liability to drivers who run red lights. As a safeguard against civil rights infringements, the cameras were installed so they would take rear-angle photographs of the cars. That way, the DOT could identify license plate numbers without targeting drivers, Popolizio says. And since the tickets issued by the cameras aren't reported to insurance companies or the state, car owners aren't penalized for infractions committed by other drivers.

With two loops embedded in each traffic lane and a minimum threshold of speed calculation to gauge whether a car is accelerating or stopping, the cameras set themselves to capture only cars about to run red lights, not cars slowing down to stop. Once DOT employees examine the developed film and verify the traffic offense, photos are scanned onto erasable magnetic optical laser discs in an optical jukebox hooked up to a Hewlett-Packard Co. 9000/H minicomputer. Using PCs, DOT workers can cross-reference collected data with Department of Motor Vehicle records to print tickets that are mailed, with the photos, to a car's registered owner. The system also allows employees of the Parking Violations Bureau to schedule court hearings and process fine payments. In court, judges can view the pictures on computer monitors while holding hearings.

Popolizio says the DOT, which plans to install 12 more cameras across New York soon, chose the client/server system because of its flexible data reporting and tracking system. At help centers, city employees can access information by computer using ticket number, name or license number. The DOT has given roughly 360,000 camera-issued tickets to date and has collected about $14 million in ticket revenues. Even though the number of tickets issued by cameras is now declining, Popolizio says people are more apt to pay the fines without questioning them because of the photographic evidence. And New Yorkers have started to recommend new intersections for camera placement.

Excluding the expense of the 12 new lights, the program is slated to cost $15 million through December. But if revenues continue to come in, the red light camera program will more than pay for itself. "Going at the existing rate, we'll make a few pennies, but that's not what the program is about," Popolizio says. "It's a safety program."

–Heath Row

VITAL STATISTICS

Organization: *New York Department of Transportation*

Application: *Red light camera automated law enforcement system*

Technologies: *A LAN of PCs linked with a Computer Associates International Inc. Ingres relational database server running HP-UX; an HP 9000/H minicomputer for optical storage; Powersoft Corp. PowerBuilder-created software running on desktops*

Scope: *36 users in the DOT, several administrative law judges and clerks in the Parking Violations Bureau*

Sponsors: *Elliot G. Sander, DOT commissioner; Rudolph Popolizio, chief, red light camera program*

Objective: *Improve public safety for citizens*

Payoff: *Red light violations at each camera location decreased 25 percent from 1994 to 1995; ticket revenues will match or exceed the system's cost*

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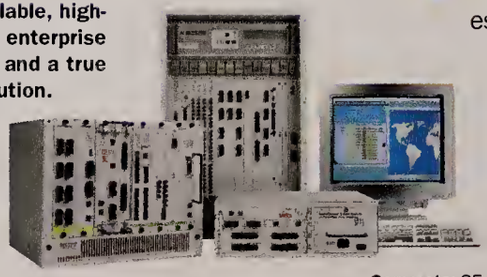

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